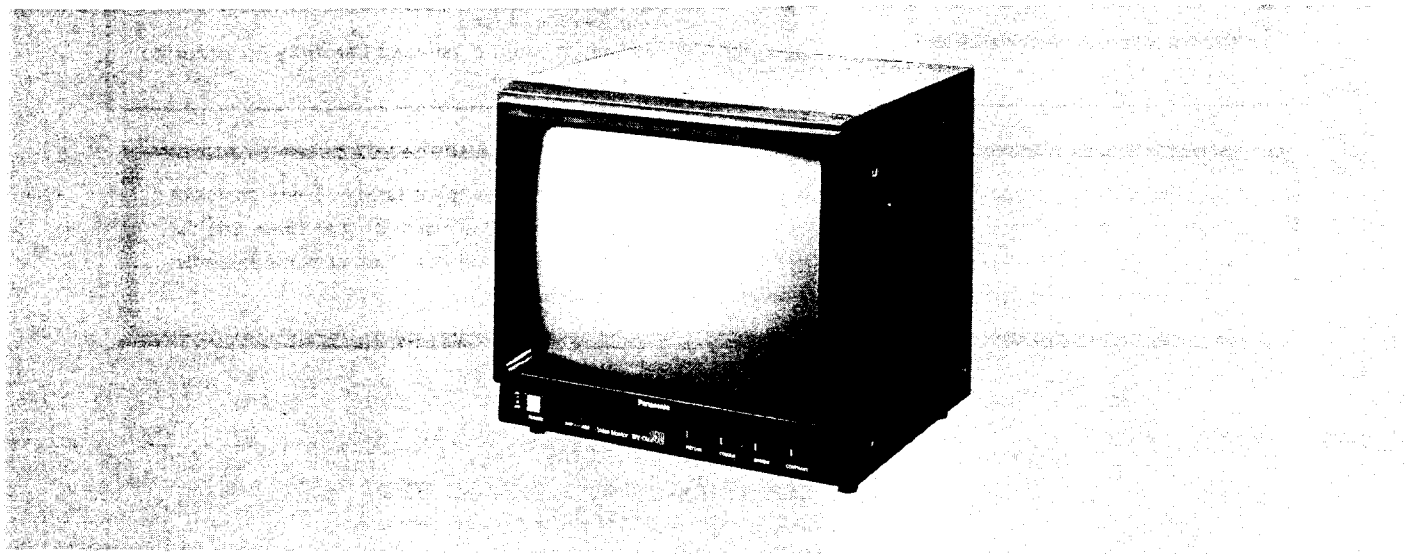
ORDER NO. AVS8810126C8

Service Manual

Colour Video Monitor

WV-CM140



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National/Panasonic

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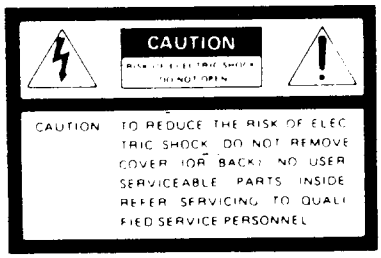

CAUTION
CAUTION TO REDUCE THE RISK OF ELEC TRIC SHOCK DO NOT REMOVE COVER (OR BACK) NO USER SERVICEABLE PARTS INSIDE REFER SERVICING TO QUALI FIED SERVICE PERSONNEL

This symbol warns the user that uninsulated voltage within the unit may have suificient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any inside part of this unit.

This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included.
Therefore, it should be read carefully in order to avoid any problems.

IMPORTANT SAFETY NOTICE

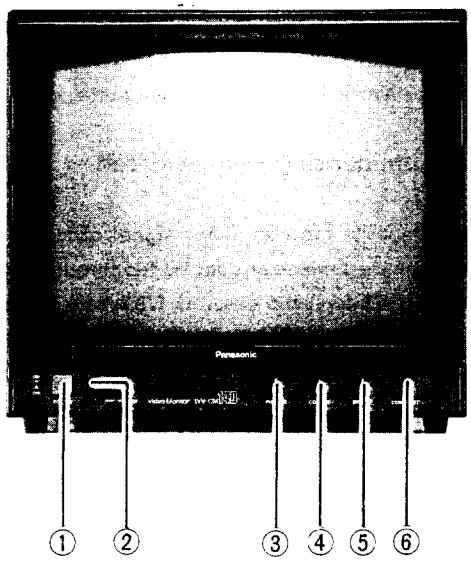
There are special components used in this equipment which are important for safety. These parts are shaded on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire, or other hazards. Do not modify the original design without permission of manufacturer.

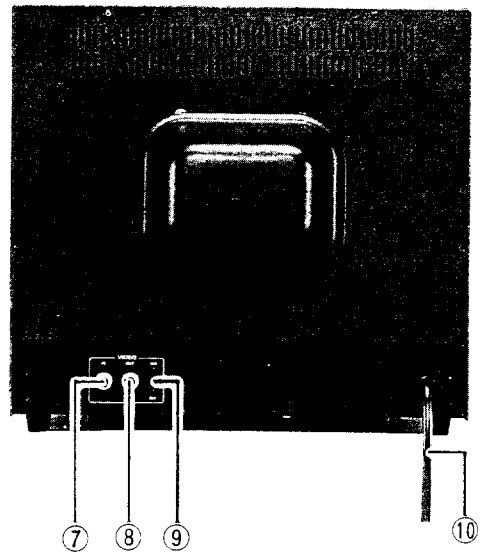
SPECIFICATIONS

Power Source:	WV-CM140/A and WV-CM140/B: 240V AC 50Hz WV-CM140/C and WV-CM140/G: 220V AC 50Hz
Power Consumption:	Approx. 61 watts
Video Input:	1.0 ~ 2.0 Vp-p composite/75Ω or Hi-Z looping through
Horizontal Resolution:	280 lines at center
Maximum Video Gain:	35 dB ± 3 dB
Sweep Linearity:	Less than 5%
Sweep Geometry:	Less than 2%
Scanning Size:	Overscanning
Overscanning:	Approx. 8%
CRT:	14'' diagonal
High Voltage:	DC 23.5 kV ± 1 kV
Ambient Operating Temperature:	14°F ~ 122°F (−10°C ~ +50°C)
Ambient Operating Humidity:	Less than 90%
Dimensions:	13-5/8''(W) x 12-1/2''(H) x 15-1/4''(D) 347(W) x 318(H) x 388(D) mm
Weight:	30.8 lbs (14 kg)

Weights and dimensions shown are approximate.
Specifications are subject to change without notice.

MAJOR OPERATING COMPONENTS





1 Power Switch (POWER)
This is a push type switch which turns the monitor on and off.
Push once and the switch remains down (▬) for turning the monitor ON.
Push again, the switch comes up (▮) for turning the monitor OFF.

2 Power Indicator

3 Picture Adjustment (PICTURE)
Turn this control clockwise for sharp picture and turn this control counterclockwise for soft picture.

4. Colour Control (COLOUR)
Turn this control clockwise to increase the picture colour and turn this control counterclockwise to decrease the picture colour.

5 Bright Control (BRIGHT)
Turn this control clockwise to increase the picture brightness.

6 Contrast Control (CONTRAST)
Turn this control clockwise to increase the picture contrast.

7 Video Input Connector (VIDEO, IN) (BNC)

8 Video Output Connector (VIDOE, OUT) (BNC)

9 Video Terminal Switch (VIDEO 75Ω/Hi-Z)
When bridging or looping through the video signal, set this switch to Hi-Z position, and for other cases this switch should be set to 75Ω position.

10 Power Cord

1. CIRCUIT DESCRIPTION

1-1 Power/Monitor Board

1-1-1 Power Circuit

The power circuit generates DC voltages, such as +115V, +24V and +12V.
When the power switch SW101 is turned ON, AC voltage is supplied to primary winding of T1 through L1.

The induced voltage obtained at secondary winding of T1 and rectified by D1 is divided by R7, VR1 (+115V ADJ) and R9. This is supplied to error amplifier consisting of Q5 and D6 where the DC voltage is compared with reference zenner voltage and the error voltage is detected. When +115V DC is increased, Q5 is turned ON and switching transistor Q4 is turned OFF.
As a result, switching pulse whose width (pulse duty) controlled by error DC voltage is applied to switching transistor Q4 for switching it ON and OFF due to variation of error DC voltage.

- +115V DC, generated by rectifying the pulse, obtained at pin 1 of secondary winding T1 with D1 is supplied to H.deflection circuit.
- The induced pulse obtained at pin 3 of secondary winding T1 is rectified by D3 and obtained DC voltage is sent to +12V regulator IC2 where the regulated +12V DC is generated and obtained at pin 3 of IC2.
- The induced pulse obtained at pin 4 of secondary winding T1 is rectified by D2 and obtained DC voltage is sent to +24V regulator IC1 where the regulated +24V DC is generated and obtained at pin 3 of IC1.

1-1-2 Signal Processing Circuit

The single chip chroma video jungle IC which contains following circuit is used on the signal processing circuit.

(A) Luminance (Y) signal circuit
(B) Chroma processing circuit
(C) Horizontal (H) deflection signal circuit
(D) Vertical (V) deflection signal circuit

(A) Luminance (Y) signal circuit

The composite monitor video signal obtained at pin 3 of CN301 on the Connector board is fed through buffer Q12 and pin 42 of IC3 to clamp circuit in IC3 where the pedestal level of signal is clamped by clamp DC voltage. The clamped signal is fed through contrast circuit in IC3 which control for sharpness the edge of video signal, controlled by VR11 (CONTRAST). This signal is sent out through pin 43 of IC3 to low pass filter (L.P.F) consisting of R58 ~ R60, C106 and L6 and band pass filter (B.P.F) consisting of R41, R42, C38 ~ C40 and L4 respectively.
The L.P.F detects only luminance (Y) signal and B.P.F detects only chrominance (chroma) signal.
The detected chroma signal is supplied to chroma encoding circuit in IC3 through pin 3 of IC3.
The detected Y signal is supplied through pin 44 of IC3 to video tone circuit in IC3. The Y signal is also fed through differential circuit consisting R57, C60, C61, C93, C105, L5 and L8 to video tone circuit in IC3. The Y signal and differentiated Y signal is mixed at video tone circuit to compensate the video aperture. VR14 (PICTURE) is a control for setting the mixing level.

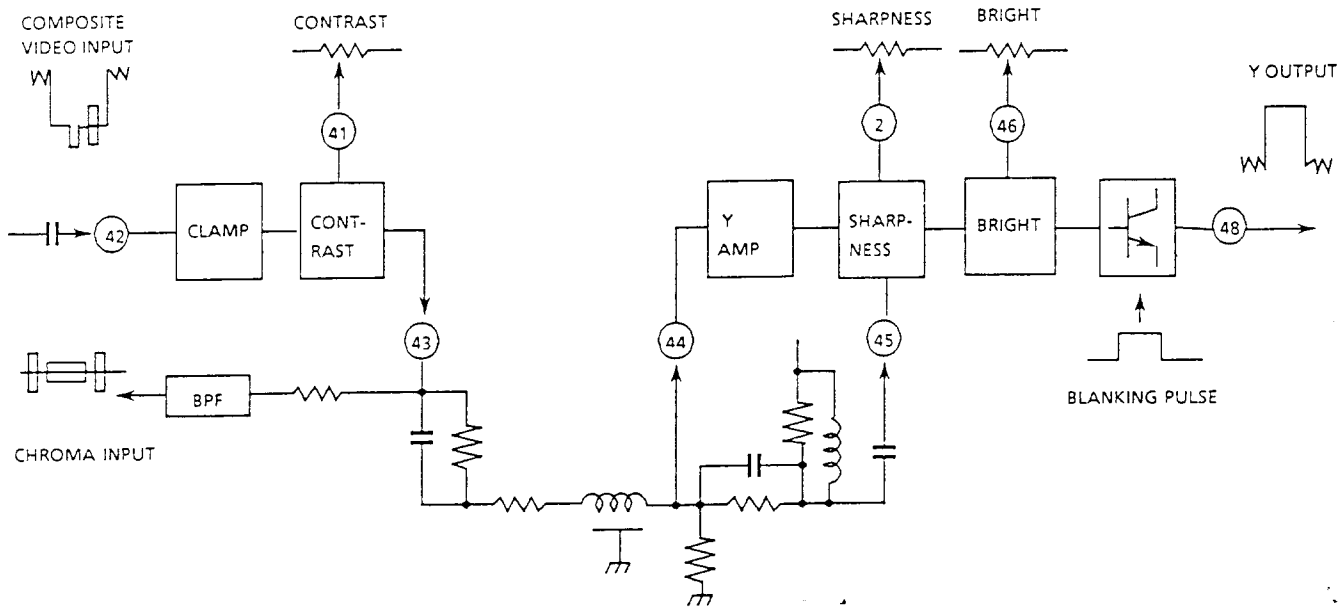


Fig. 1-1 Block Diagram of Y signal Circuit

The Y signal under goes video tone circuit is sent to brightness control circuit in IC3 where the Y signal level is controlled by the VR4 (SUBBRIGHT) and VR12 (BRIGHT).
The level controlled Y signal is then sent to blanking circuit where the horizontal (H) and vertical (V) blanking periods are treated by the H.flyback pulse from H.deflection circuit and V.blanking pulse generated in IC3. This signal is supplied to CRT socket board through Y amplifier in IC3 and buffer Q20.

(B) Chroma Processing Circuit

Chroma processing circuit reproduces R-Y, B-Y and G-Y color difference signals from the composite video signal at the demodulator circuit through contrast amplifier, band pass filter (B.P.F) and automatic color control (ACC) amplifier circuit.
Burst signal is controlled for setting to specified level at the B-Y demodulation output using ACC loop.
Subcarrier signal is generated by crystal oscillator which synchronize the APC loop.

o Automatic color control (ACC) circuit
The ACC circuit automatically controls the gain of carrier chrominance signal to maintain a constant color saturation.
VR13 (COLOR) is a control for setting the gain of amplifier.

o 1H delay circuit
Chrominance signal is sent from pin 5 through ACC circuit in IC3 to this 1H delay circuit where the signal is delayed 1H and is supplied to R-Y, B-Y demodulation circuit through pins 7 and 9 of IC3 respectively.

o R-Y, B-Y and G-Y demodulator circuit
The R-Y and B-Y demodulator circuits produce color difference signal by mixing the chroma signal, subcarrier signal and Y signal. The G-Y signal is produced at G-Y matrix circuit using R-Y and B-Y signals. The R-Y, B-Y and G-Y signals produced in IC3 is supplied to R, B and G output circuits on the CRT Socket board through respective pins 12, 11 and 13 of IC3 respectively.

o Automatic phase control (APC) circuit
The APC circuit is a control for the 4.43MHz oscillation frequency by comparing the phase of the subcarrier generated by the 4.43MHz oscillator circuit with the phase of reference burst signal.

o Color killer circuit
If the killer circuit receives black and white signal, the luminance signal of around 4.43MHz and circuit noise appear as color noise on the screen. When black and white signal is supplied, the color killer circuit operates and kills the color control circuit and the 4.43MHz oscillator circuit in IC3.

o 4.43MHz oscillator circuit
The 4.43MHz oscillator circuit generates the subcarrier and amplifies it. The oscillator is consisting of crystal oscillator X1, R50, C51 and C52 connected at pins 17, 18 and 20 of IC3, and the oscillated signal is sent to the 4.43MHz oscillator circuit.

o Tint control circuit
This circuit is a control for color phase and connected to the demodulator circuit, APC circuit and 4.43MHz oscillator circuit. VR7 (CHROMA PHASE) is a control for color phase.

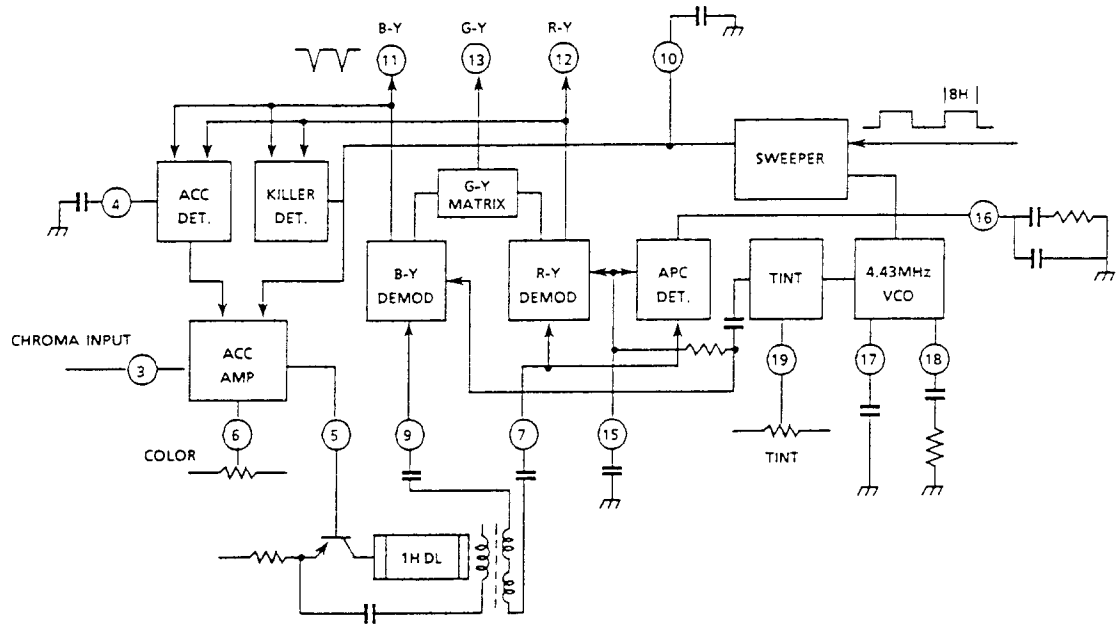


Fig. 1-2 Block Diagram of Chroma Processing Circuit

(C) Horizontal (H) deflection signal circuit

The composite monitor video signal from buffer Q12 is fed through pin 37 of IC3 to sync separator which detects composite sync pulse. The detected composite sync pulse is supplied to equalizing pulse and vertical sync pulse gate circuit for detecting only H sync signal. This signal is supplied to automatic frequency control-1 (AFC1) circuit.

The 32fH VCO (voltage controlled oscillator) circuit generates the clock pulse which is used for producing the H.drive pulse. The oscillator which consists of ceramic oscillator X2, R70 ~ R72 and C69 ~ C70 connected at pins 31, 32 and 33 of IC3, and the oscillated signal whose frequency is approx. 500KHz is sent to the 32fH VCO circuit. This is divided by 32 times at 1/32 divider circuit in IC3 and the divided pulse is supplied to AFC1 circuit where the signal is compared with H sync in phase automatically to control the oscillating frequency.

To produce the necessary pulse width and phase of H drive pulse, the pulse is sent to the another AFC circuit (AFC2) which contains variable phase shifter. The width and phase of H.drive pulse are controlled by the flyback pulse and VR6 (H.CENTER). The flyback pulse is differentiated by C63 and VR6, and the slant of differentiate pulse is controlled the phase of H.drive pulse. The pulse width is settled by the impedance at pin 29 of IC3.

The H sync signal from equalizing pulse and vertical sync pulse gate circuit and H drive pulse from 1/32 divider circuit is mixed at burst gate pulse circuit to produce the burst gate pulse (B.G.P) and the B.G.P is supplied to Y signal circuit and chroma encoding circuit in IC3.

The H drive signal from AFC2 circuit is supplied to H.deflection circuit through H.drive circuit in IC3 and pin 27 of IC3.

The incident voltage come out at pin 9 of flyback transformer T3 rectified by D13 and is supplied to the emitter of Q24. When the monitor is normally operated, rectified voltage is low thus Q24 keeps OFF, however, if rectified voltage output becomes excessively high, the rectified voltage also becomes high and Q24 is turned ON.

As a result, DC voltage is supplied to the X-ray protector in IC3 through pin 26 for functioning the protector to stop the H drive signal supply.

(D) Vertical (V) deflection signal circuit

The H drive pulse generated at 1/32 divider circuit is sent to V/H divider circuit where the pulse is divided 262.3 times to produces 50Hz pulse. This pulse is synchronized by the V.sync signal which is sync separated from composite sync at V.sync separation circuit in IC3 to produces V.drive pulse.

This pulse is supplied to V.deflection circuit through V.driver in IC3 and pin 23 of IC3.

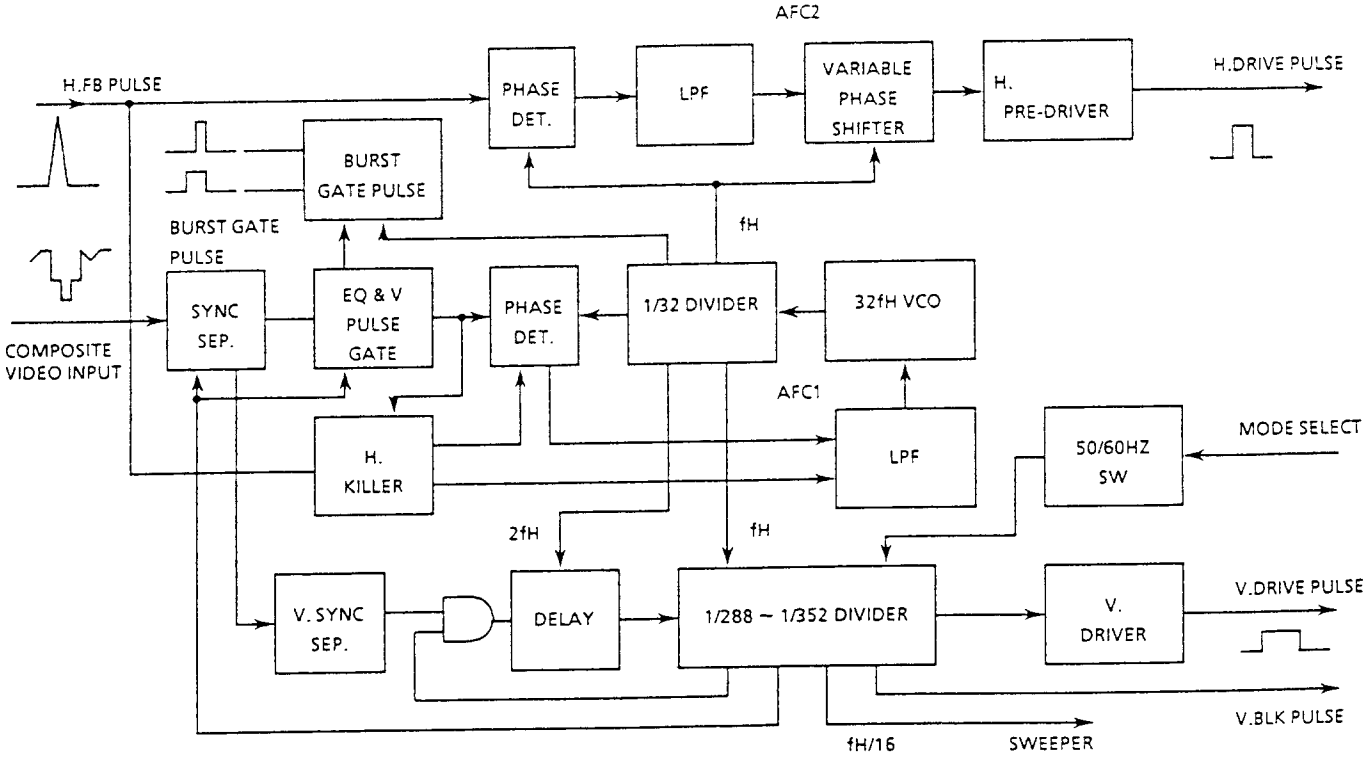


Fig. 1-3 Block Diagram of V and H.Deflection Signal Circuit

1-1-3 Horizontal (H) Deflection Circuit

The oscillated H.drive pulse from pin 27 of IC3 is supplied to H.pulse switching amplifier consisting of Q10 and T2. The induced H.pulse obtained at secondary winding of T2 is supplied to CRT H.deflection coil through drive amplifier Q11.

1-1-4 Vertical (V) Deflection Circuit

The vertical drive pulse from pin 23 of IC3 is supplied through pin 4 of IC4 to booster circuit and V.deflection output circuit respectively. The booster circuit produces V.blanking pulse and boosted it to necessary level. The V.deflection output circuit produces V.sawtooth signal and the V.sawtooth signal is mixed with V.blanking pulse to produces V.deflection signal. This is supplied to CRT vertical deflection coil through pin 2 of IC4.

The V.sync signal obtained at pin 2 of IC3 is amplified by Q14 and Q15. The amplified V.sync signal is supplied through differential circuit composed of C75 and R76 to Q25 and Q17 respectively. At rise timing of differential signal, Q25 and Q17 turn ON and negative trigger is obtained at collectors. The negative trigger at collector of Q25 with differentiated V.deflection signal are mixed and fed back through pin 21 of IC3 to V.driver circuit. The negative trigger at collector Q17 with V.centering and V.size signal also mixed and fed back through pin 22 of IC3 to V.driver circuit. In the V.driver circuit phase of these signals are compared to compensate the start position of V.deflection signal.

VR2 (V.CENTER) is a centering control which controls the direct current flowing to V.deflection coil to set the V.scanning position on the CRT.

VR3 (V.SIZE) is a control for adjusting V.scanning size.

1-1-5 High Voltage Circuit

The flyback pulse supplied to the primary winding of flyback transformer (F.B.T) is stepped up by the F.B.T and the boosted pulses obtained at secondary winding of the F.B.T are rectified to generate high voltage.

2. CRT Socket Board

The R-Y, G-Y and B-Y signals from the Power/Monitor board are supplied to base of Q203, Q202 and Q201 respectively where the R-Y, G-Y and B-Y signals are mixed with luminance (Y) signal which is fed from the Power/Monitor board through SW201 (SERVICE SWITCH) to each emitters of Q203, Q202 and Q201, and amplified necessary level to drive the CRT. The R, G and B signals obtained at each collectors are supplied to respective cathode of CRT.

When the SW201 is set to the R position, the Y signal is only supplied to Q203 therefore, only R signals supplied to CRT. This position is used to purity adjustment.

When the SW201 is set to the SERVICE position, Y signal is fed back to the vertical (V) deflection, as a result, R-Y, G-Y and B-Y chroma signals are supplied to CRT and horizontally deflected R, G and B lines appeared at CRT screen. This position is used for adjusting the white balance.

ADJUSTMENT PROCEDURE

1. TEST EQUIPMENT REQUIRED

The following equipment is required for adjustment of WV-CM140 Color Video Monitor.

- Oscilloscope
- Color TV signal generator
- Digital voltmeter
- Degaussing coil
- Completely aligned Color Camera
- Underscanned color video monitor
- Resolution chart

2. DISASSEMBLY PROCEDURE FOR ADJUSTMENT

- Remove eight screws holding the cover and remove the cover by pulling it backward. (Fig. 2-1-1)

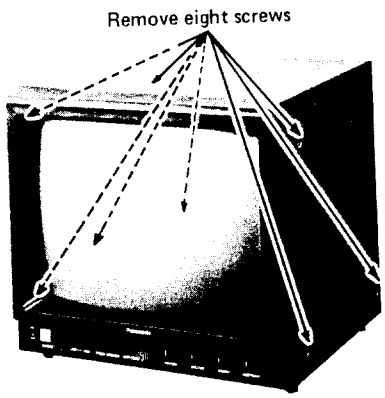


Fig. 2-1-1

3. REPLACEMENT PROCEDURE

CRT Replacement

- Remove the cover as previously described in Section 2.
- Remove three screws holding the printed circuit board (PCB) and slide back the PCB unit. (Fig. 3-1)

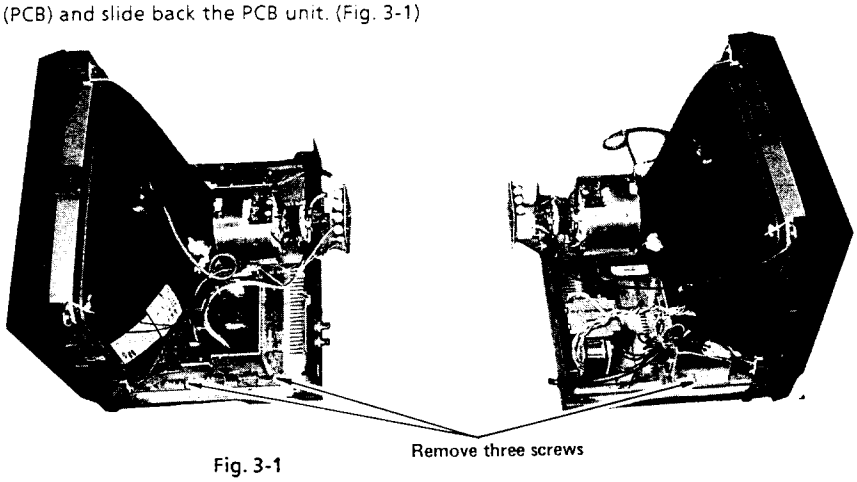


Fig. 3-1

- Disconnect the anode cap. (Fig. 3-2)

  Caution : Make sure that the anode voltage is completely discharged by directly connected between anode terminal and chassis.

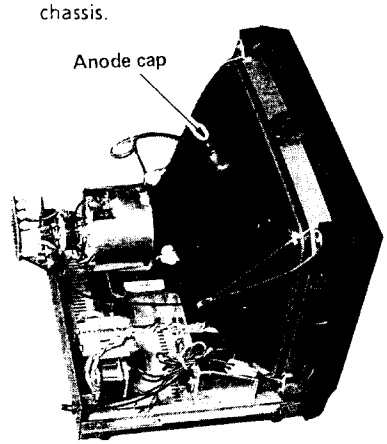


Fig. 3-2

- Disconnect the CRT socket board by pulling it backward. (Fig. 3-3)
- Remove four screws holding CRT and remove CRT.
- Remove deflection yoke shield cover.
- Loosen the screws holding deflection yoke and purity, convergence magnets assy and remove the yoke and magnets assy by pulling them backward.

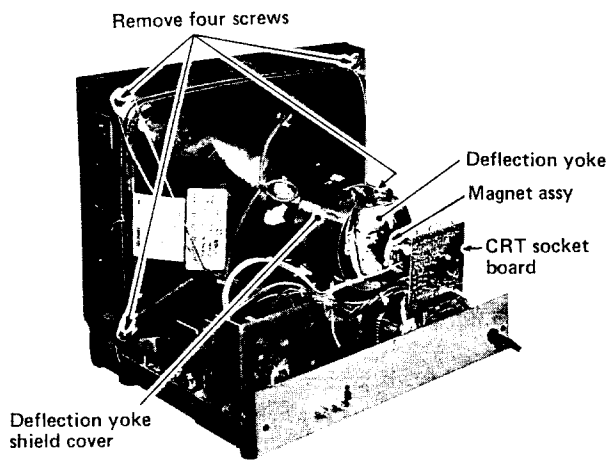


Fig. 3-3

4. ADJUSTMENT PROCEDURE

4-1 Connection and Setting Up for Adjustment

4-1-1 Connection

- Connect the coaxial cable between the VIDEO OUTPUT terminal of Color Camera and CAMERA INPUT connector of Color Video Monitor WV-CM140.
- Connect the coaxial cable between VIDEO OUTPUT connector of TV signal generator and VIDEO INPUT connector of Color Video Monitor WV-CM140.
- Connect the coaxial cable between VIDEO OUTPUT connector of Color Video Monitor WV-CM140 and color video monitor. (Fig. 4-1)

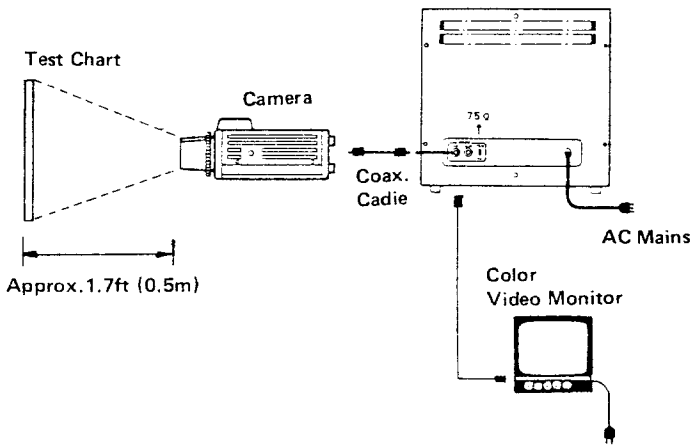


Fig. 4-1

4-1-2 Disassembling

- Disassemble the Video Monitor WV-CM140 according to Section 2 DISASSEMBLY PROCEDURE FOR ADJUSTMENT on page 7.

4-1-3 Position of Controls and Switches

- Set the controls and switches on the Video Monitor as follows;

Power ON/OFF switch	ON position
Color control	Center (Click) position
Contrast control	Center (Click) position
Bright control	Center (Click) position
Picture adjustment	Center (Click) position
Service switch (SW201) on the CRT socket board	Center (NOR) position

4-2 Adjustment Procedure

(1) 115V adjustment

Test point :	Resistor R6	Power/Monitor board
Adjust :	VR1 (115V ADJ)	Power/Monitor board

- Disconnect camera from the video input connector on the rear panel.
- Turn ON the power switch.
- Connect the digital voltmeter to resistor R6 on the Power/Monitor board.
- Adust VR1 (115V ADJ) for 115V ± 0.5V.

(2) Focus coarse adjustment

Adjust :	VR9 (FOCUS)	Power/Monitor board (FLYBACK TRANSFORMER)
Observe :	Video Monitor	

- Supply the dots signal to VIDEO INPUT connector of Video Monitor.
- While observing Video Monitor, adjust VR9 (FOCUS) so that the dots on the CRT screen become as small/clear as possible.

(3) Screen cutoff adjustment

Adjusts :	VR15 (SCREEN)	Power/Monitor board (FLYBACK TRANSFORMER)
	VR204 (R CUTOFF)	CRT socket board
	VR202 (B CUTOFF)	CRT socket board
Observe :	Video Monitor	

- Supply the white raster signal to the VIDEO INPUT connector of Video Monitor.
- Set the service switch SW201 on the CRT socket board to SERVICE position.
- Turn VR204 (R CUTOFF) and VR202 (CUTOFF) fully counterclockwise.
- While observing Video Monitor, adjust VR15 (SCREEN) so that the green horizontal line just appears on the CRT screen.
- While observing Video Monitor, adjust VR204 (R CUTOFF) and VR202 (B CUTOFF) for same level/brightness as green line.
- Reset service switch SW201 to normal (NOR) position.

(4) Purity adjustment

Adjust :	Purity Magnet assy
Observe :	Video Monitor

- Remove the shield cover for deflection coil for easy adjustment.
- Remove three DY wedge for holding the position of deflection coil.

- Supply the white raster signal to the VIDEO INPUT connector of Video Monitor.
- Confirm that the purity magnet is positioned at 1-13/16"(46mm) from edge of CRT neck. (Fig. 4-2-1)

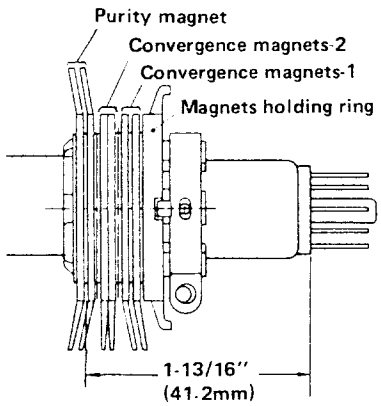


Fig. 4-2-1

- Set the service switch SW201 on the CRT socket board to R.DRIVE position for observing Red raster on the screen.
- Loosen the holding screw of deflection coil and move back the coil until it reaches to the magnet assy. (Fig. 4-2-2)

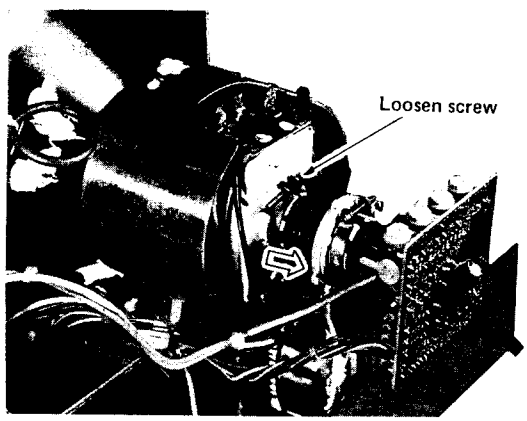


Fig. 4-2-2

- Degauss the CRT using degaussing coil.
- Loosen magnet holding ring (Fig. 4-2-3) by turning it approximately 90° counterclockwise.

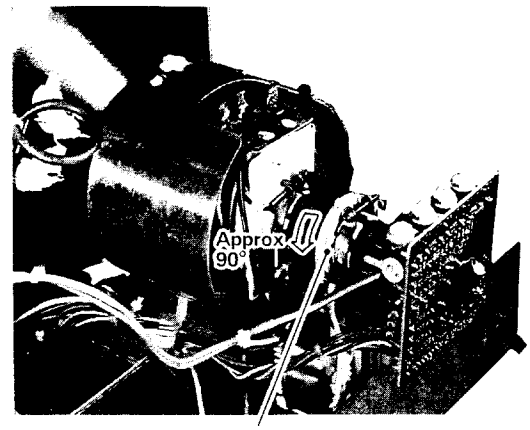


Fig. 4-2-3

- While observing Video Monitor, adjust purity magnets (Fig. 4-2-3) so that the red area positions at center of CRT screen. (Fig. 4-2-4)

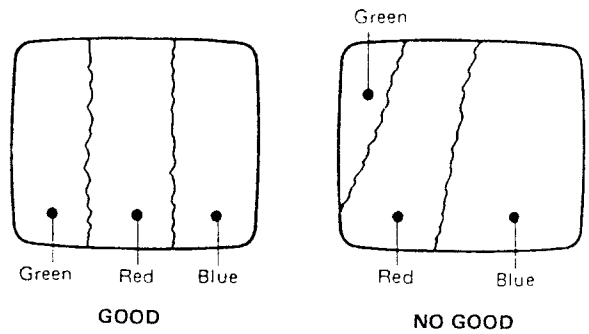


Fig. 4-2-4

- While observing Video Monitor, move deflection coil forward until red color fully occupies the screen and tighten the holding screw. (Fig. 4-2-5)
- The magnet holding ring will be fastened after completing next step.
- Reset service switch SW201 to normal (NOR) position.

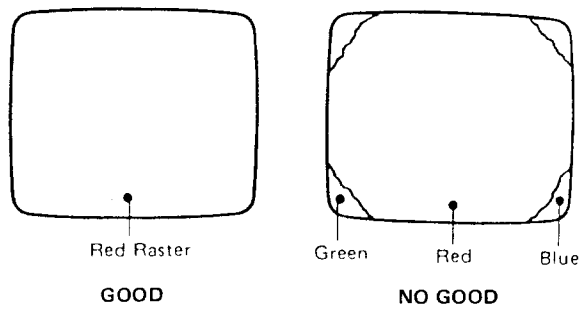


Fig. 4-2-5

(5) Convergence adjustment

Adjusts :	Convergence magnets-1	Magnet Assy
	Convergence magnets-2	Magnet Assy
Observe :	Video Monitor	

- Remove the shield cover for deflection coil.
- Remove the three DY wedge on the CRT, which hold the position of deflection coil.
- Supply the dots signal to VIDEO INPUT connector of Video Monitor.
- Loosen magnets holding ring (Fig. 4-2-3) by turning it approximately 90° counterclockwise, as previous step.
- While observing Video Monitor, adjust convergence magnets-1 (Fig. 4-2-1) so that the Red and Blue dots on the center area of CRT screen is overlapped.
- While observing Video Monitor, adjust convergence magnets-2 (Fig. 4-2-1) so that Green and Magenta (Red + Blue) dots on the center area of CRT screen is overlapped, that is, dots become white.
- Change the signal to crosshatch signal from dots signal.
- While observing Video Monitor, adjust convergence for corner of CRT by shift the front portion of deflection coil vertically, horizontally or diagonally and hold the deflection coil using three DY wedge.
- Fasten magnets holding ring.

(6) Subcontrast and subbright adjustment

Test point :	Pin 9 of CN202	CRT socket board
Adjust :	VR5 (SUBCONTRAST)	Power/Monitor board
	VR4 (SUBBRIGHT)	Power/Monitor board

- Supply the stairstep signal to the VIDEO INPUT connector of Video Monitor.
- Turn VR11 (CONTRAST) fully clockwise to maximum position and VR12 (BRIGHT) fully counterclockwise to minimum position.
- Connect the oscilloscope to pin 9 of CN202 (CRT Socket).
- Adjust VR5 (SUBCONTRAST) so that the blanking level to the top step of negative stairstep signal is 48Vp-p. (Fig. 4-2-6)

  If the signal is suppressed, readjust VR4 (SUBBRIGHT) so that the signal is not suppressed.

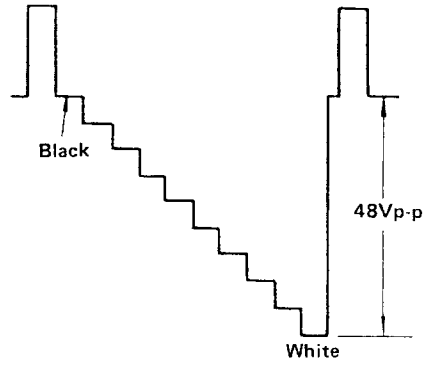


Fig. 4-2-6

- Connect the oscilloscope to pin 7 of CN202 (CRT Socket).
- Adjust VR203 (R DRIVE) so that the blanking level to the top step of negative stairstep signal is 48Vp-p.
- Connect the oscilloscope to pin 3 of CN202 (CRT Socket).
- Adjust VR201 (B DRIVE) so that the blanking level to the top step of negative stairstep signal is 48Vp-p.
- Turn VR11 (CONTRAST) AND VR12 (BRIGHT) to their mechanical center position.
- Adjust VR4 (SUBBRIGHT) so that the 2 steps from the black are suppressed to black color while observing the monitor screen. (Fig. 4-2-7)

  If the black portion of stairstep is not black but other colors, fine-adjust VR204 (R LOW LIGHT) and VR202 (B LOW LIGHT) on CRT socket board for black color.

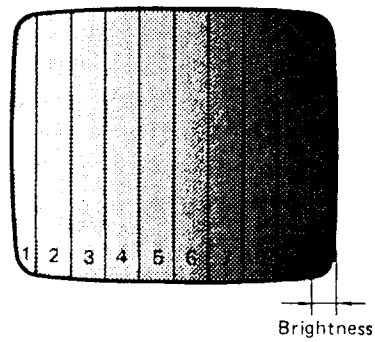
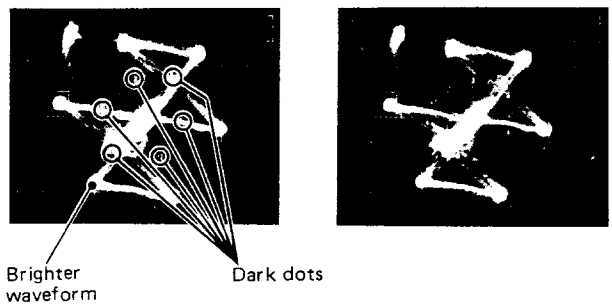


Fig. 4-2-7

(7) Chroma and delay adjustment

Test points:	TP3(R)	Power/Monitor board
	TP4(B)	Power/Monitor board
Adjusts:	VR7	Power/Monitor board
	(CHROMA PHASE)	
	VR8	Power/Monitor board
	(CHROMA GAIN)	
	L7	Power/Monitor board
	(DL MATCHING)	

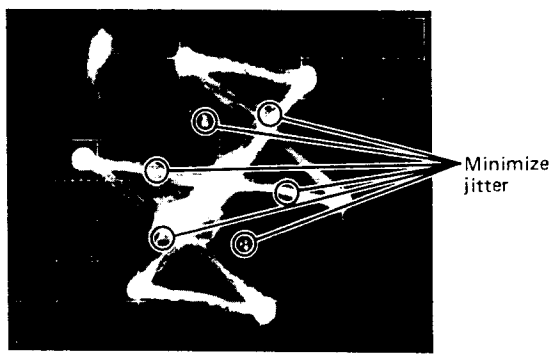
- Supply the color bar signal to the VIDEO INPUT connector of Video Monitor.
- Turn VR14 (PICTURE) fully counterclockwise to minimum position, VR13 (COLOR) and VR10 (SUB COLOR) fully clockwise to maximum position.
- Set the oscilloscope to the X-Y functional mode.
- Connect the X probe of oscilloscope to TP3 (R) and the Y probe to TP4 (B).
- While observing oscilloscope, adjust VR7 (CHROMA PHASE) so that the brighter waveform and dark dots are roughly coincided. (Fig. 4-2-8)



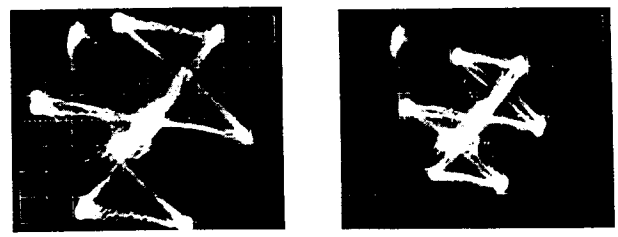
GOOD NO GOOD

Fig. 4-2-8

- Turns VR8 (CHROMA GAIN) fully counterclockwise once and turns it back slowly and stop it where the jitter of dark dots are minimized. (Fig. 4-2-9)



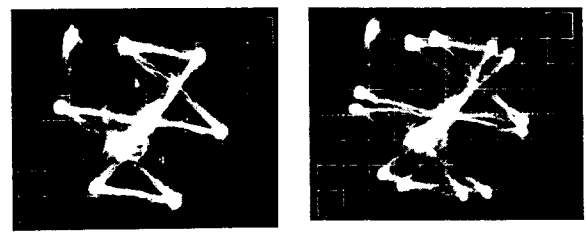
GOOD



NO GOOD NO GOOD

Fig. 4-2-9

- Adjust L7 (DL MATCHING) so that the brighter waveform is coincided. (Fig. 4-2-10)



GOOD NO GOOD

Fig. 4-2-10

- Adjust VR7 (CHROMA PHASE) so that the brighter waveform is coincided. (Fig. 4-2-11)

GOOD NO GOOD

Fig. 4-2-11

- Repeat adjusting VR7, VR8 and L7 so that the brighter waveform is coincided and jitter of dark dots are minimized.

(8) Sub color adjustment

Test point:	TP4 (B)	Power/Monitor board
Adjust:	VR10 (SUB COLOR)	Power/Monitor board

- Supply the color bar signal to the VIDEO INPUT connector of Video Monitor.
- Turn VR13 (COLOR) to center position.
- Set the oscilloscope to the normal mode.
- Connect the osilloscope to TP4(B) on the Power/Monitor board.
- Adjust VR10 (SUB COLOR) so that the waveform becomes 0.55V. (Fig. 4-2-12)

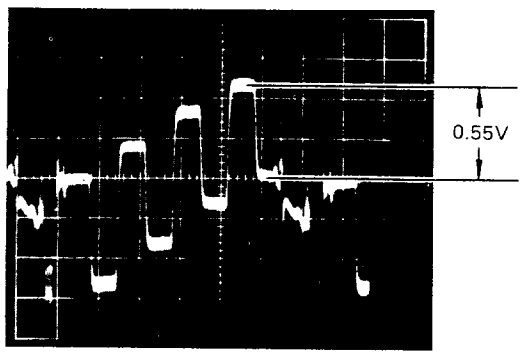


Fig. 4-2-12

(9) White balance adjustment

Adjusts :	VR203 (R DRIVE)	CRT socket board
	VR201 (B DRIVE)	CRT socket board
Observe :	Video Monitor	

- Supply the white raster signal to the VIDEO INPUT connector of Video Monitor.
- While observing Video Monitor, adjust VR203 (R DRIVE) and VR201 (B DRIVE) so that the raster on the CRT screen is white.

(10) H.centering, V.centering, V.size adjustment

Adjusts :	VR6 (H.CENTERING)	Power/Monitor board
	VR2 (V.CENTERING)	Power/Monitor board
	VR3 (V.SIZE)	Power/Monitor board
Observe :	Video monitor	

- Connect the completely aligned color camera to the CAMERA INPUT connector of Video Monitor WV-CM140.
- Aim the camera at the resolution chart (YWV1400RB99) so that the arrows of the chart touch to the edge of the raster on the underscanned color video monitor connected to the VIDEO OUT connector of WV-CM140.
- Adjust VR3 (V.SIZE) so that the circle of the resolution chart on the WV-CM140 monitor screen becomes true circle.
- Adjust VR6 (H.CENTERING) and VR 2 (V.CENTERING) so that the center of the resolution chart positions on the center of the monitor screen.

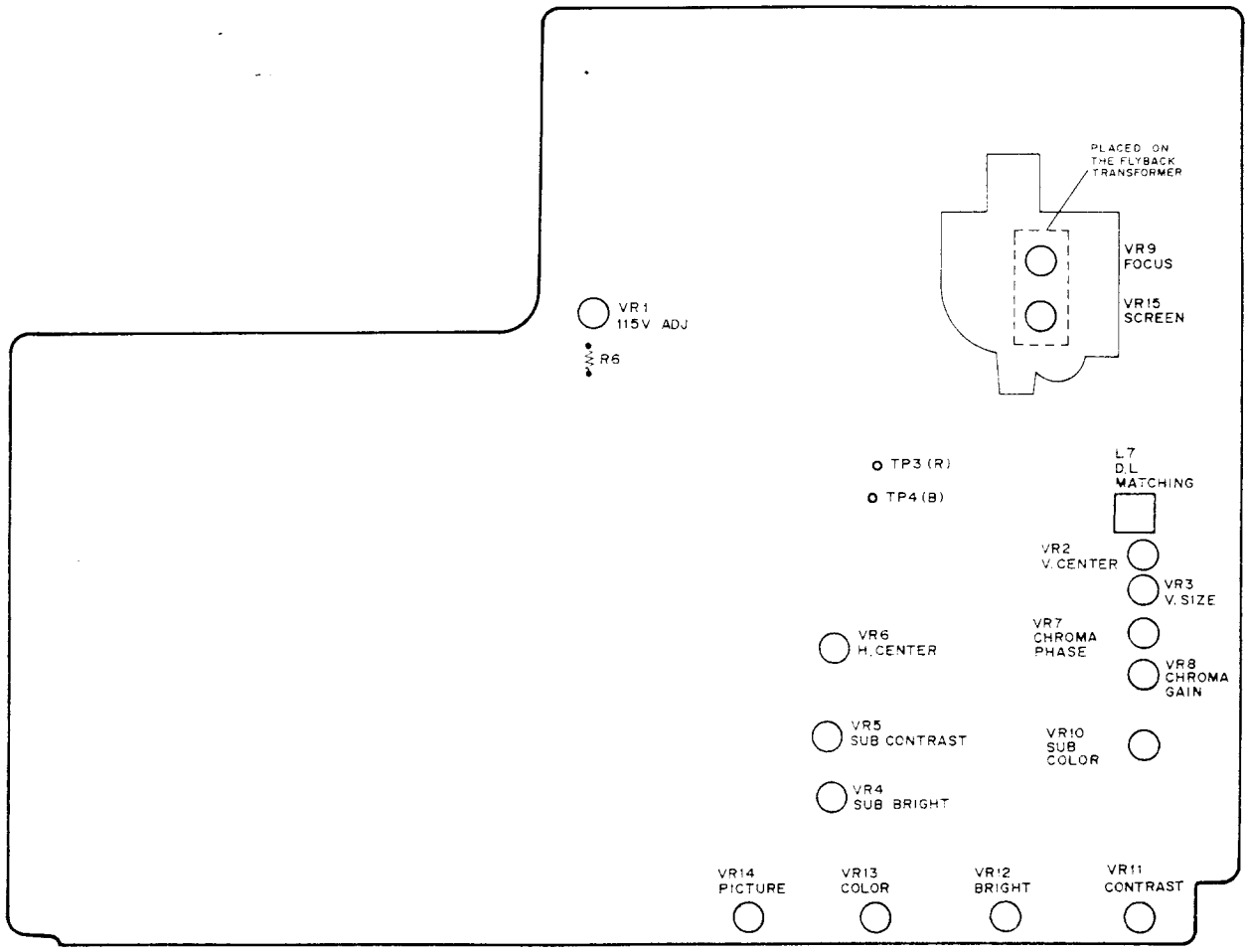
(11) Focus fine adjustment

Adjust :	VR9 (FOCUS)	Power/Monitor board (FLYBACK TRANSFORMER)
Observe :	Video Monitor	

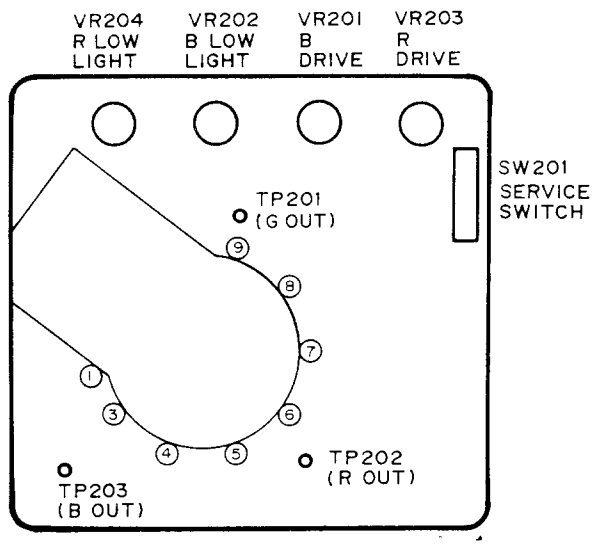
- Supply the dots signal to the VIDEO INPUT connector of Video Monitor.
- While observing Video Monitor, adjust VR9 (FOCUS) so that the dots on the CRT screen are as small/clear as possible.

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

POWER / MONITOR BOARD

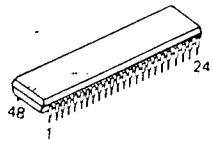


CRT SOCKET BOARD

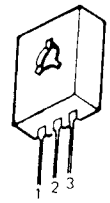


APPEARANCE OF IC, TRANSISTOR AND DIODE

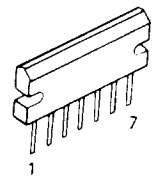
UPC1420CA



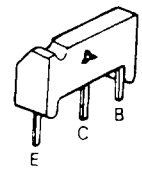
AN78M12
AN78M24



UPC1378H



2SB642-QRS
2SD637-RS
2SB643-RS
2SD639-RS



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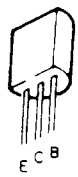

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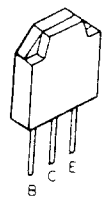

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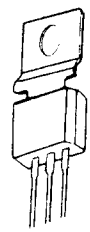
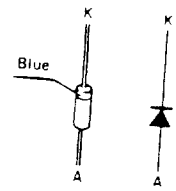
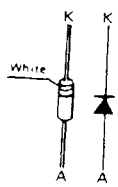


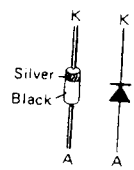
ERB1201RK
MA165



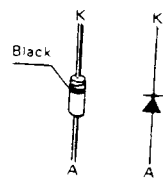
RD6.2JT1B2



EU01V0



RD12ESB3T



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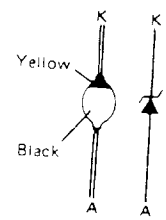
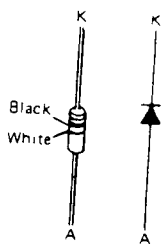
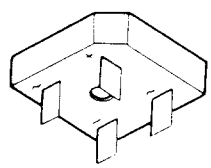


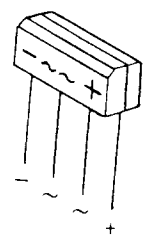
MA162



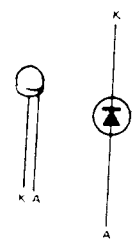
RB150
RB152

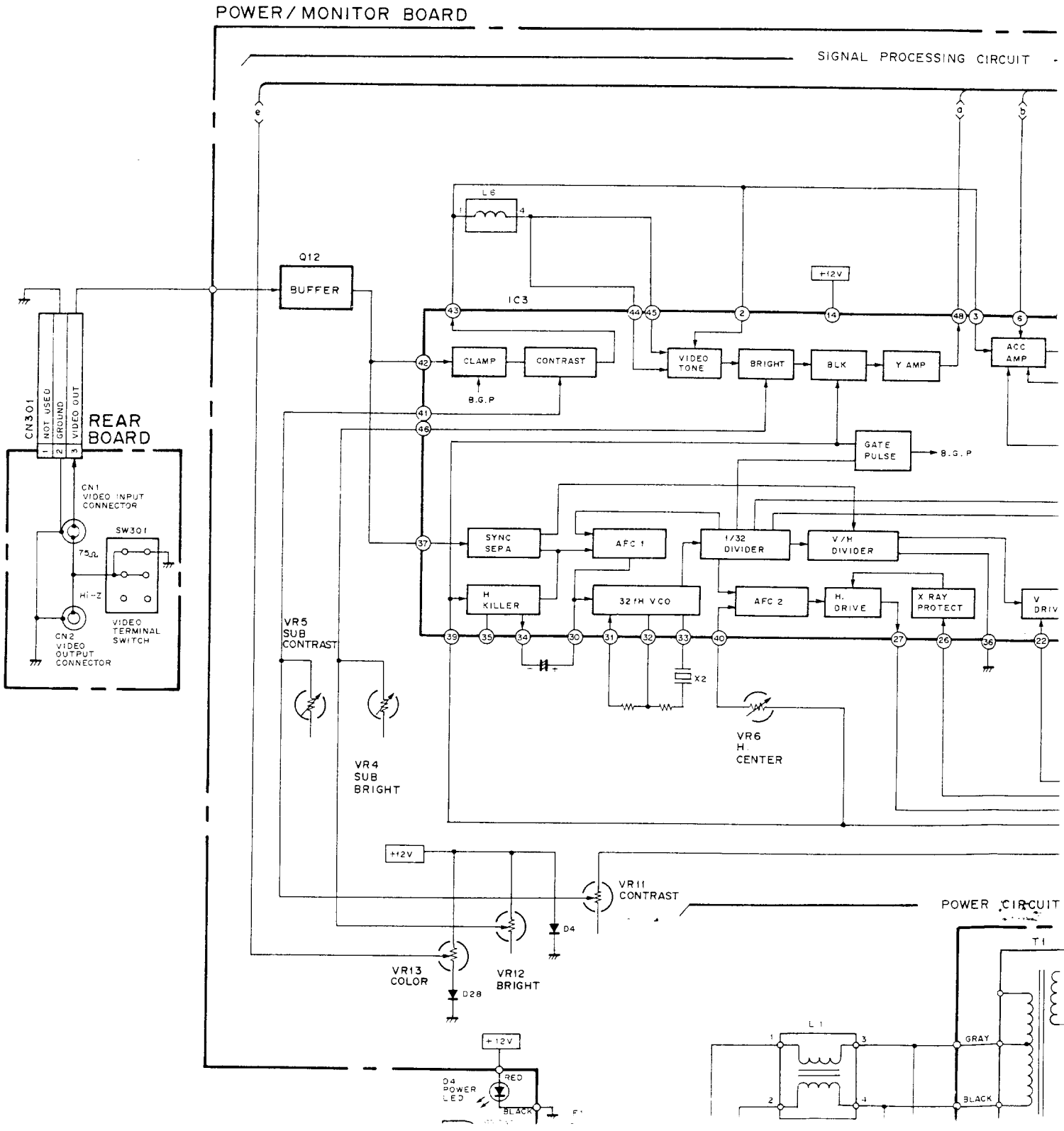


YWRB154

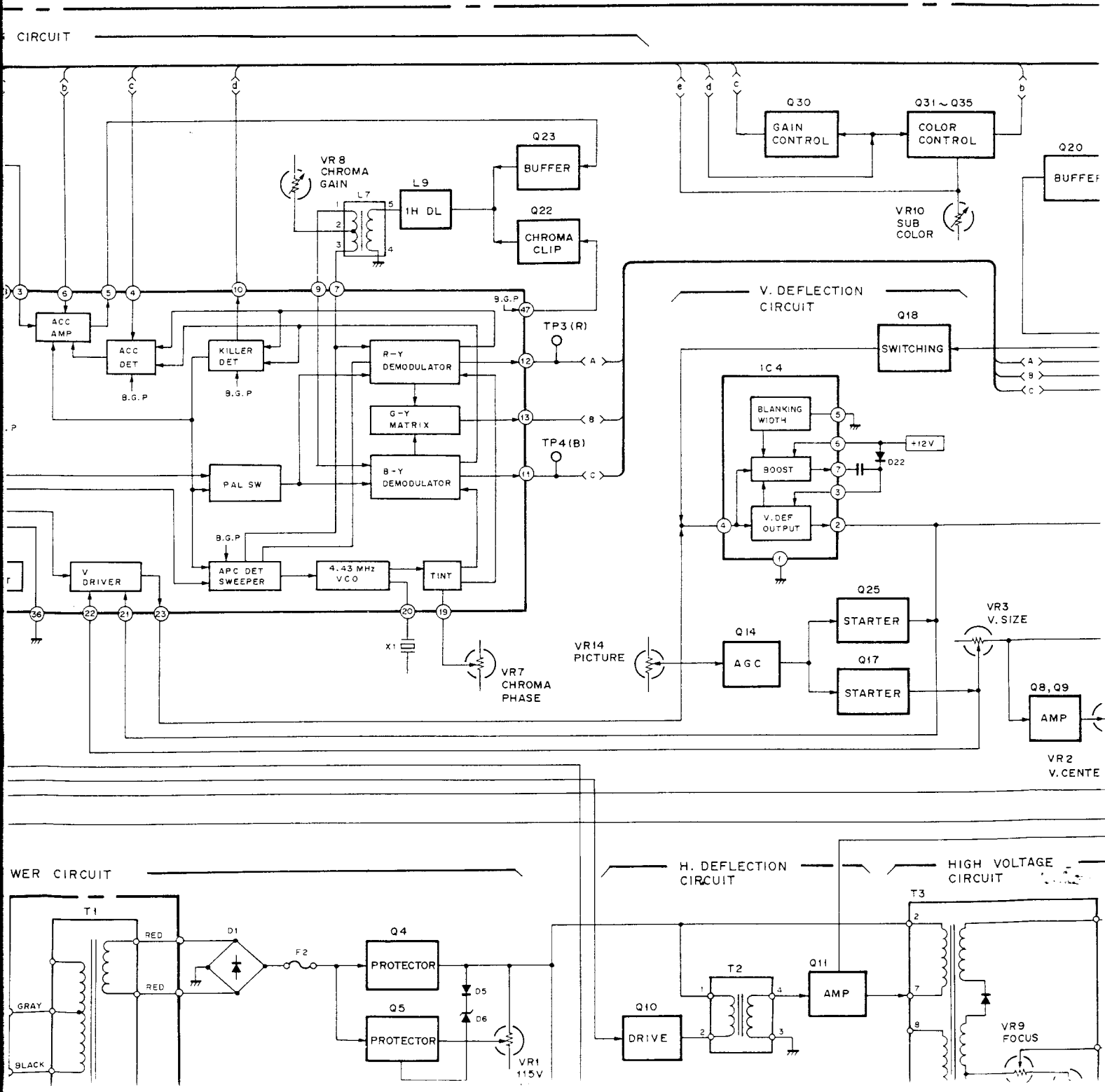


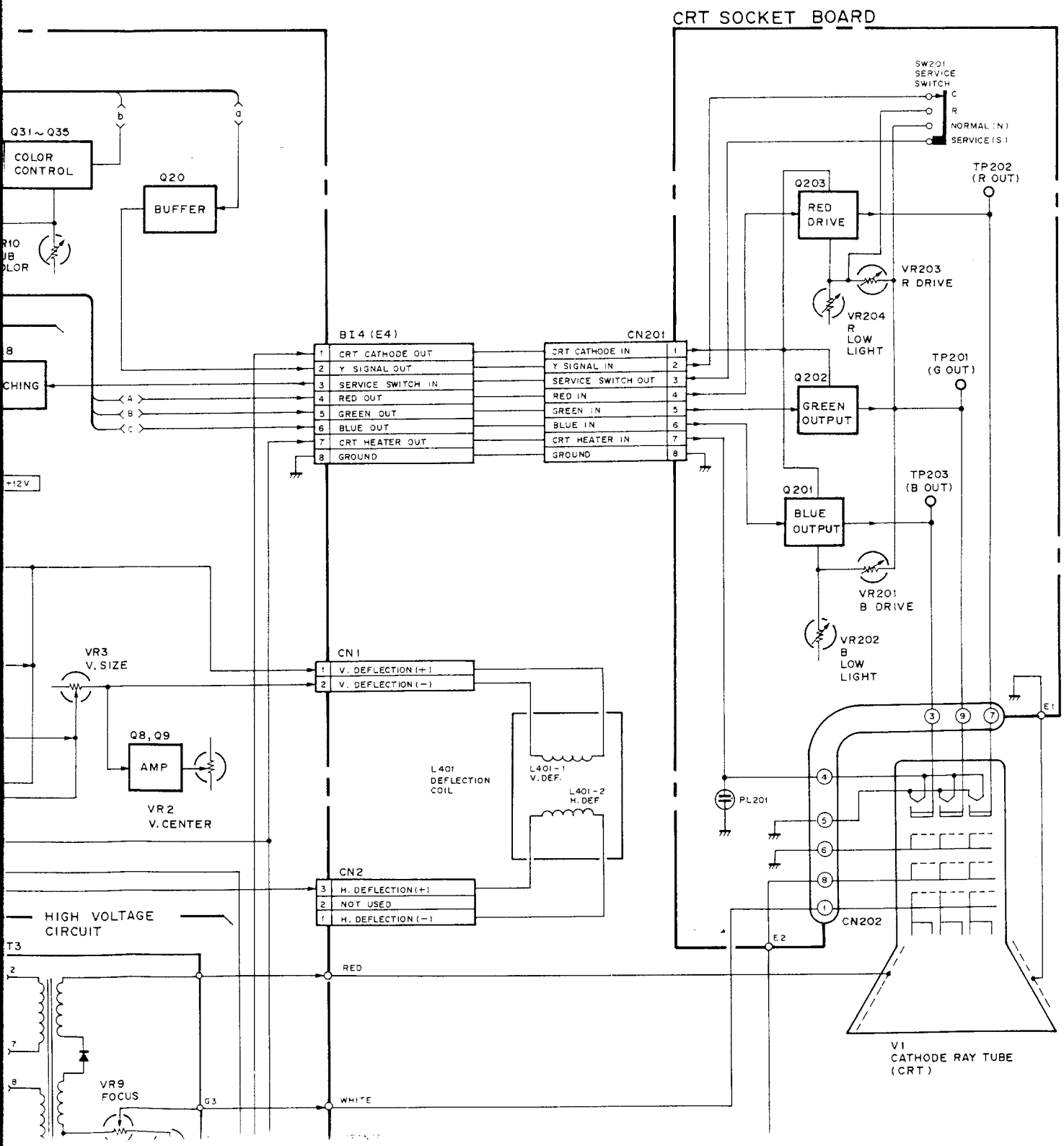
LN21RPH

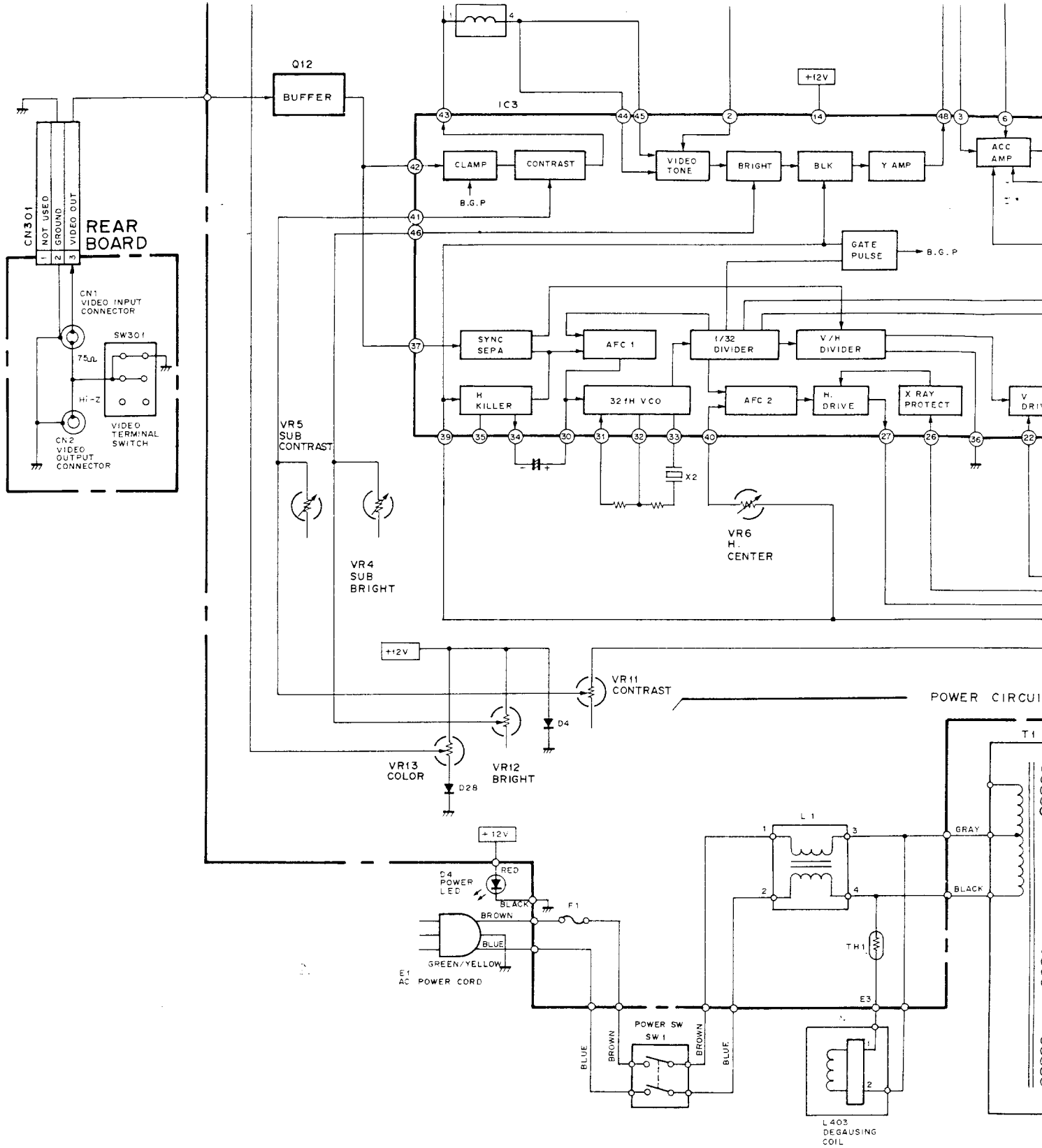


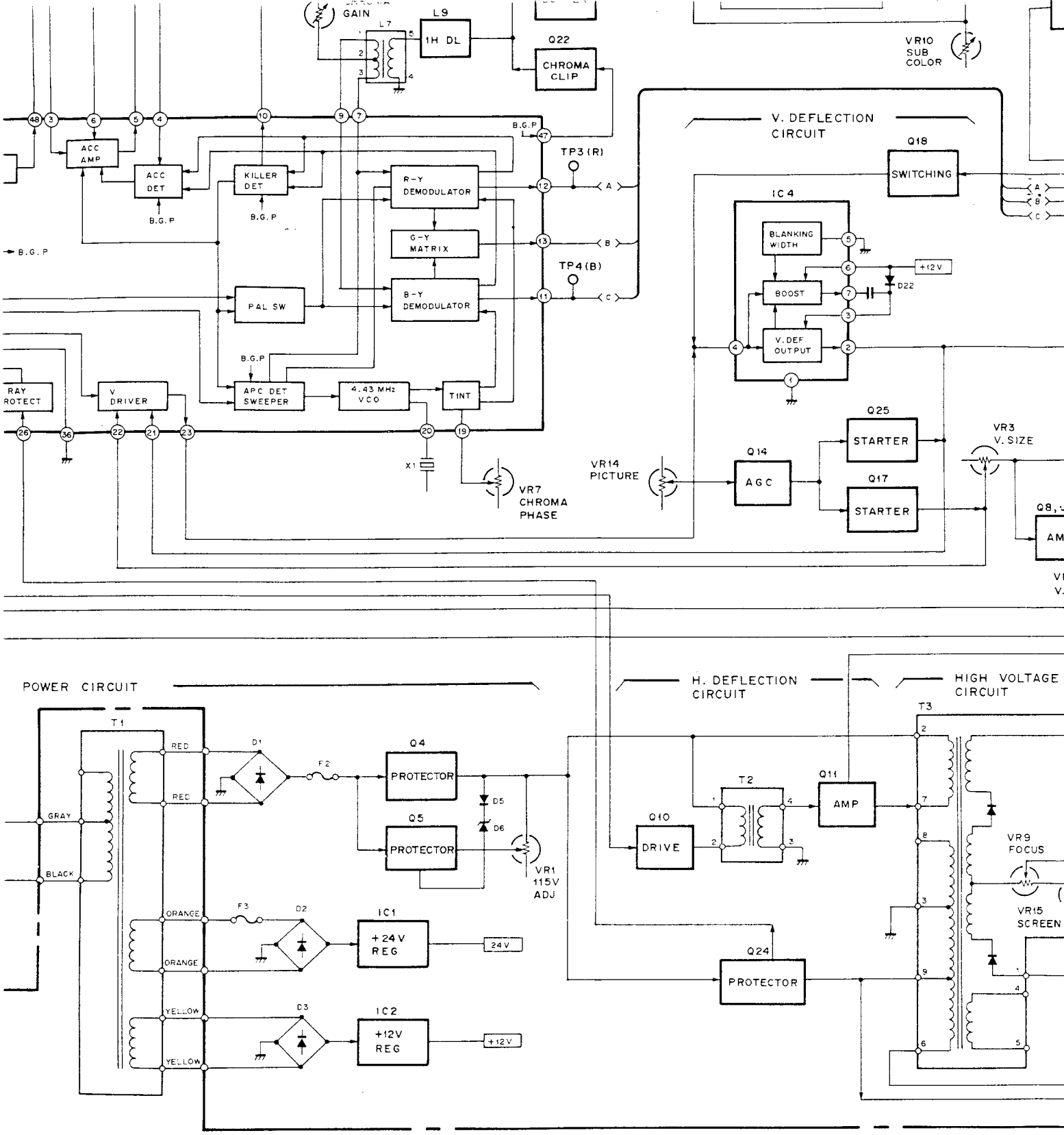

POWER / MONITOR BOARD
SIGNAL PROCESSING CIRCUIT
POWER CIRCUIT
REAR BOARD
CN301
NOT USED
GROUND
VIDEO OUT
CN1
VIDEO INPUT CONNECTOR
SW301
75Ω
Hi-Z
VIDEO TERMINAL SWITCH
CN2
VIDEO OUTPUT CONNECTOR
Q12
BUFFER
IC3
L6
+12V
CLAMP
CONTRAST
B.G.P
VIDEO TONE
BRIGHT
BLK
Y AMP
ACC AMP
GATE PULSE
SYNC SEPA
AFC 1
1/32 DIVIDER
V/H DIVIDER
H KILLER
32fH VCO
AFC 2
H. DRIVE
X RAY PROTECT
X2
VR5 SUB CONTRAST
VR4 SUB BRIGHT
VR6 H. CENTER
VR11 CONTRAST
VR12 BRIGHT
VR13 COLOR
D4
D28
D4 POWER LED
RED
BLACK
T1
L1
GRAY
BLACK

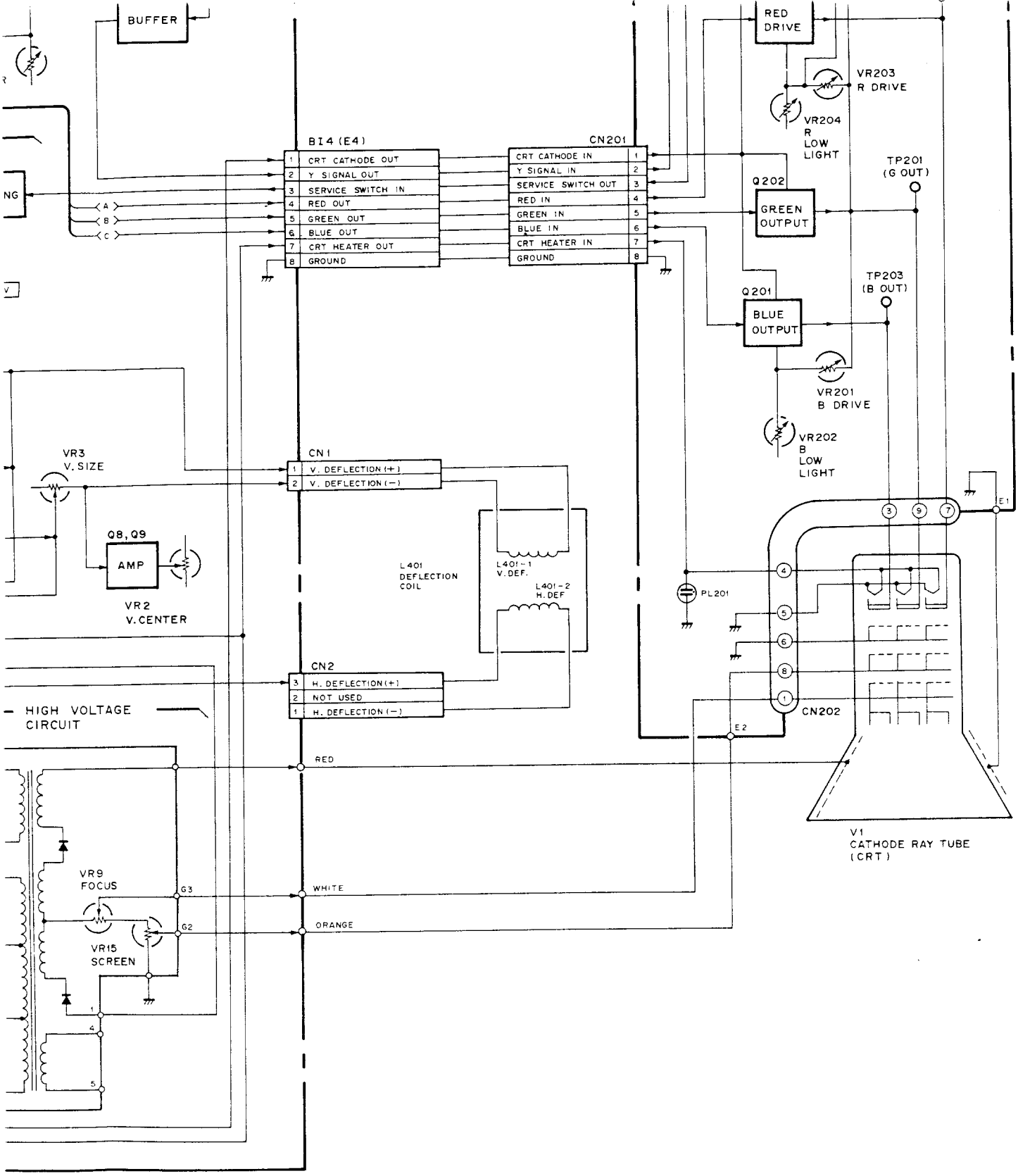
BLOCK DIAGRAM OF COLOUR VIDEO MONITOR WV-CM140

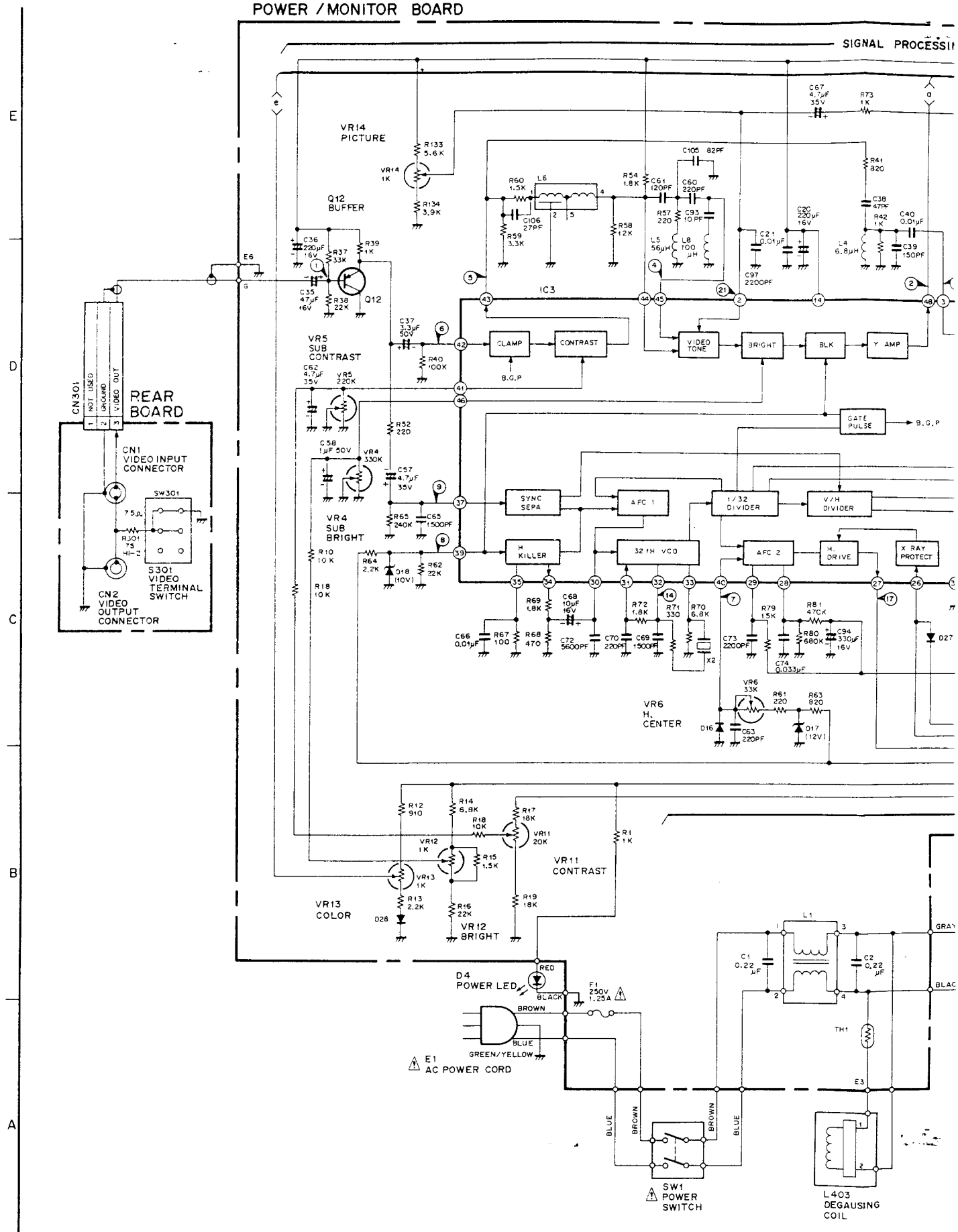



CRT SOCKET BOARD
SW201
SERVICE
SWITCH
C
R
NORMAL (N)
SERVICE (S)
TP202
(R OUT)
Q203
RED
DRIVE
VR203
R DRIVE
VR204
R
LOW
LIGHT
TP201
(G OUT)
Q202
GREEN
OUTPUT
TP203
(B OUT)
Q201
BLUE
OUTPUT
VR201
B DRIVE
VR202
B
LOW
LIGHT
Q31 ~ Q35
COLOR
CONTROL
Q20
BUFFER
BI4 (E4)
1 CRT CATHODE OUT
2 Y SIGNAL OUT
3 SERVICE SWITCH IN
4 RED OUT
5 GREEN OUT
6 BLUE OUT
7 CRT HEATER OUT
8 GROUND
CN201
CRT CATHODE IN 1
Y SIGNAL IN 2
SERVICE SWITCH OUT 3
RED IN 4
GREEN IN 5
BLUE IN 6
CRT HEATER IN 7
GROUND 8
A
B
C
+12V
VR3
V. SIZE
Q8, 09
AMP
VR2
V. CENTER
CN1
1 V. DEFLECTION (+)
2 V. DEFLECTION (−)
L401
DEFLECTION
COIL
L401-1
V. DEF.
L401-2
H. DEF
CN2
3 H. DEFLECTION (+)
2 NOT USED
1 H. DEFLECTION (−)
PL201
CN202
E1
E2
HIGH VOLTAGE
CIRCUIT
T3
RED
WHITE
VR9
FOCUS
G3
V1
CATHODE RAY TUBE
(CRT)

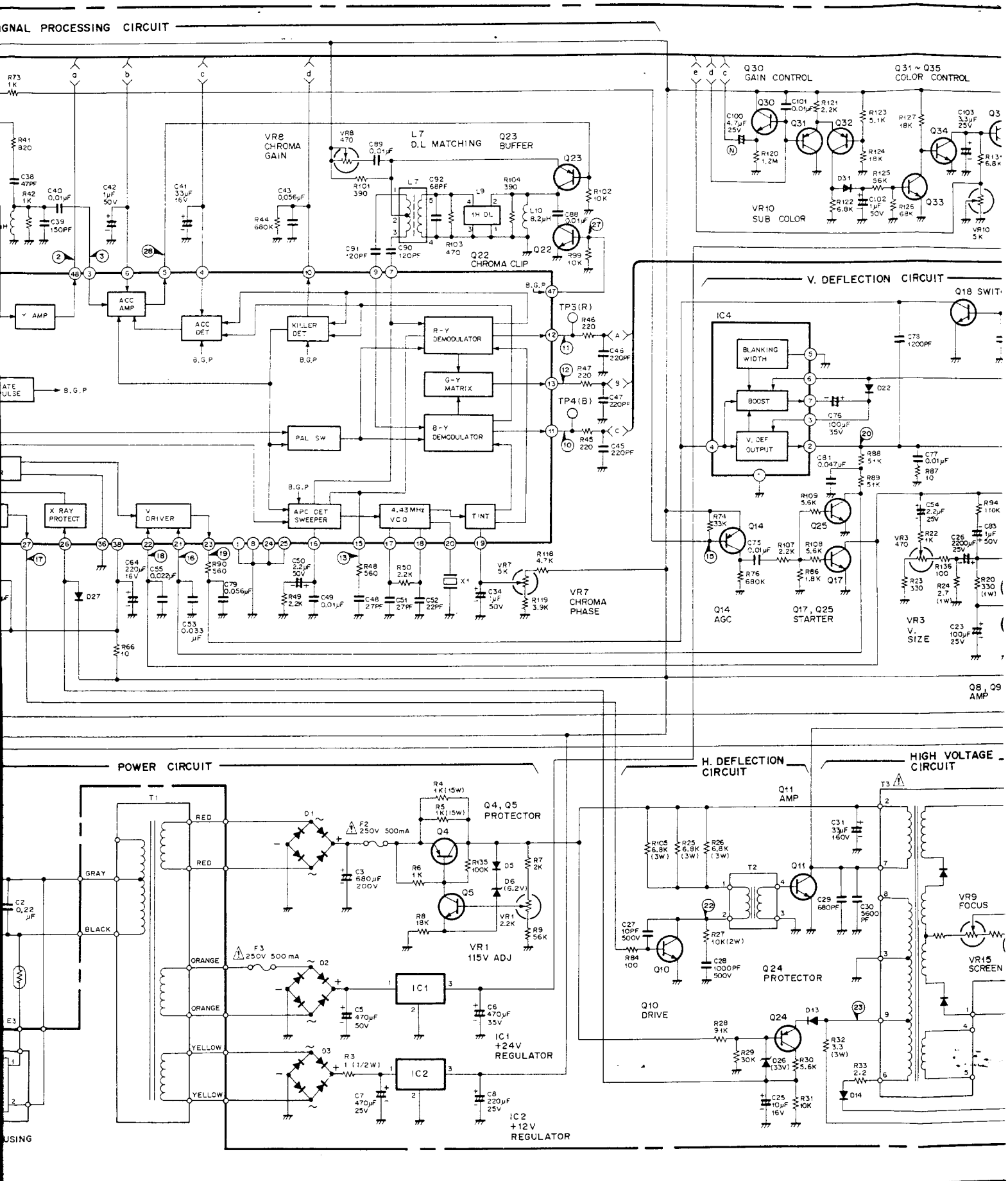

REAR BOARD
CN301
NOT USED
GROUND
VIDEO OUT
CN1 VIDEO INPUT CONNECTOR
SW301
75Ω
HI-Z
VIDEO TERMINAL SWITCH
CN2 VIDEO OUTPUT CONNECTOR
Q12
BUFFER
IC3
+12V
CLAMP
CONTRAST
B.G.P
VIDEO TONE
BRIGHT
BLK
Y AMP
ACC AMP
GATE PULSE
SYNC SEPA
AFC 1
1/32 DIVIDER
V/H DIVIDER
H KILLER
32fH VCO
AFC 2
H. DRIVE
X RAY PROTECT
X2
VR5 SUB CONTRAST
VR4 SUB BRIGHT
VR6 H. CENTER
VR11 CONTRAST
VR13 COLOR
VR12 BRIGHT
D4
D28
POWER CIRCUI
T1
L1
GRAY
BLACK
D4 POWER LED
RED
BLACK
BROWN
BLUE
GREEN/YELLOW
E1 AC POWER CORD
F1
TH1
E3
POWER SW SW1
BLUE
BROWN
BROWN
BLUE
L403 DEGAUSING COIL


GAIN
L7
L9
1H DL
Q22
CHROMA CLIP
VR10 SUB COLOR
ACC AMP
ACC DET
KILLER DET
B.G.P
R-Y DEMODULATOR
G-Y MATRIX
B-Y DEMODULATOR
PAL SW
TP3 (R)
TP4 (B)
V. DEFLECTION CIRCUIT
Q18
SWITCHING
IC4
BLANKING WIDTH
BOOST
V. DEF OUTPUT
+12V
D22
V DRIVER
APC DET SWEEPER
4.43 MHz VCO
TINT
X1
VR7 CHROMA PHASE
VR14 PICTURE
Q14
AGC
Q25
STARTER
Q17
STARTER
VR3 V. SIZE
POWER CIRCUIT
T1
RED
RED
GRAY
BLACK
ORANGE
ORANGE
YELLOW
YELLOW
D1
F2
F3
D2
D3
Q4
PROTECTOR
Q5
PROTECTOR
D5
D6
VR1 115V ADJ
IC1
+24V REG
24V
IC2
+12V REG
+12V
H. DEFLECTION CIRCUIT
HIGH VOLTAGE CIRCUIT
T2
Q10
DRIVE
Q11
AMP
Q24
PROTECTOR
T3
VR9 FOCUS
VR15 SCREEN

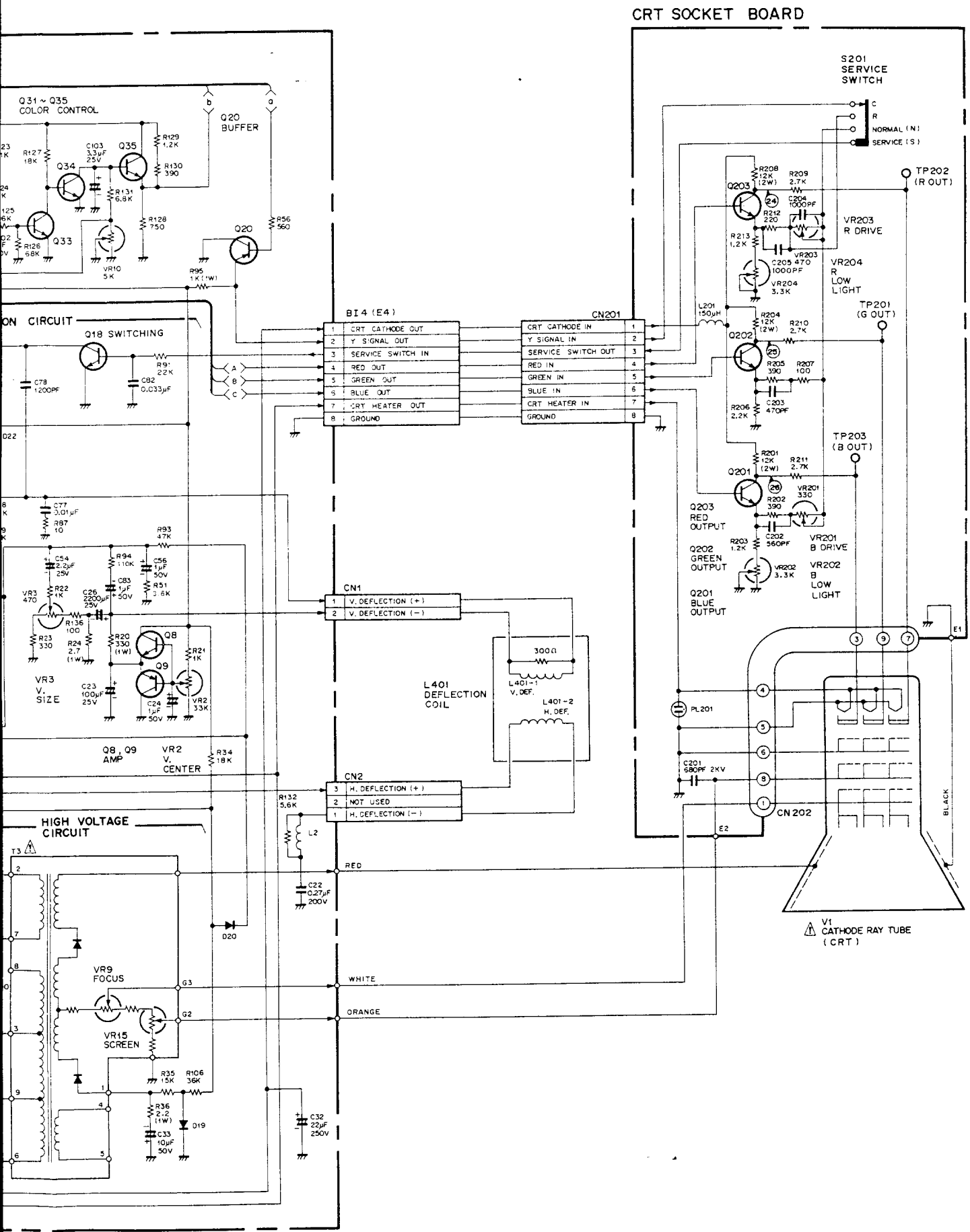

BUFFER
RED DRIVE
VR203 R DRIVE
VR204 R LOW LIGHT
BI4 (E4)
CN201
1 CRT CATHODE OUT
2 Y SIGNAL OUT
3 SERVICE SWITCH IN
4 RED OUT
5 GREEN OUT
6 BLUE OUT
7 CRT HEATER OUT
8 GROUND
CRT CATHODE IN 1
Y SIGNAL IN 2
SERVICE SWITCH OUT 3
RED IN 4
GREEN IN 5
BLUE IN 6
CRT HEATER IN 7
GROUND 8
TP201 (G OUT)
Q202
GREEN OUTPUT
TP203 (B OUT)
Q201
BLUE OUTPUT
VR201 B DRIVE
VR202 B LOW LIGHT
VR3 V. SIZE
CN1
1 V. DEFLECTION (+)
2 V. DEFLECTION (−)
Q8, Q9
AMP
VR2 V. CENTER
L401 DEFLECTION COIL
L401-1 V. DEF.
L401-2 H. DEF
PL201
CN2
3 H. DEFLECTION (+)
2 NOT USED
1 H. DEFLECTION (−)
HIGH VOLTAGE CIRCUIT
CN202
E1
E2
RED
WHITE
ORANGE
VR9 FOCUS
VR15 SCREEN
G3
G2
V1 CATHODE RAY TUBE (CRT)

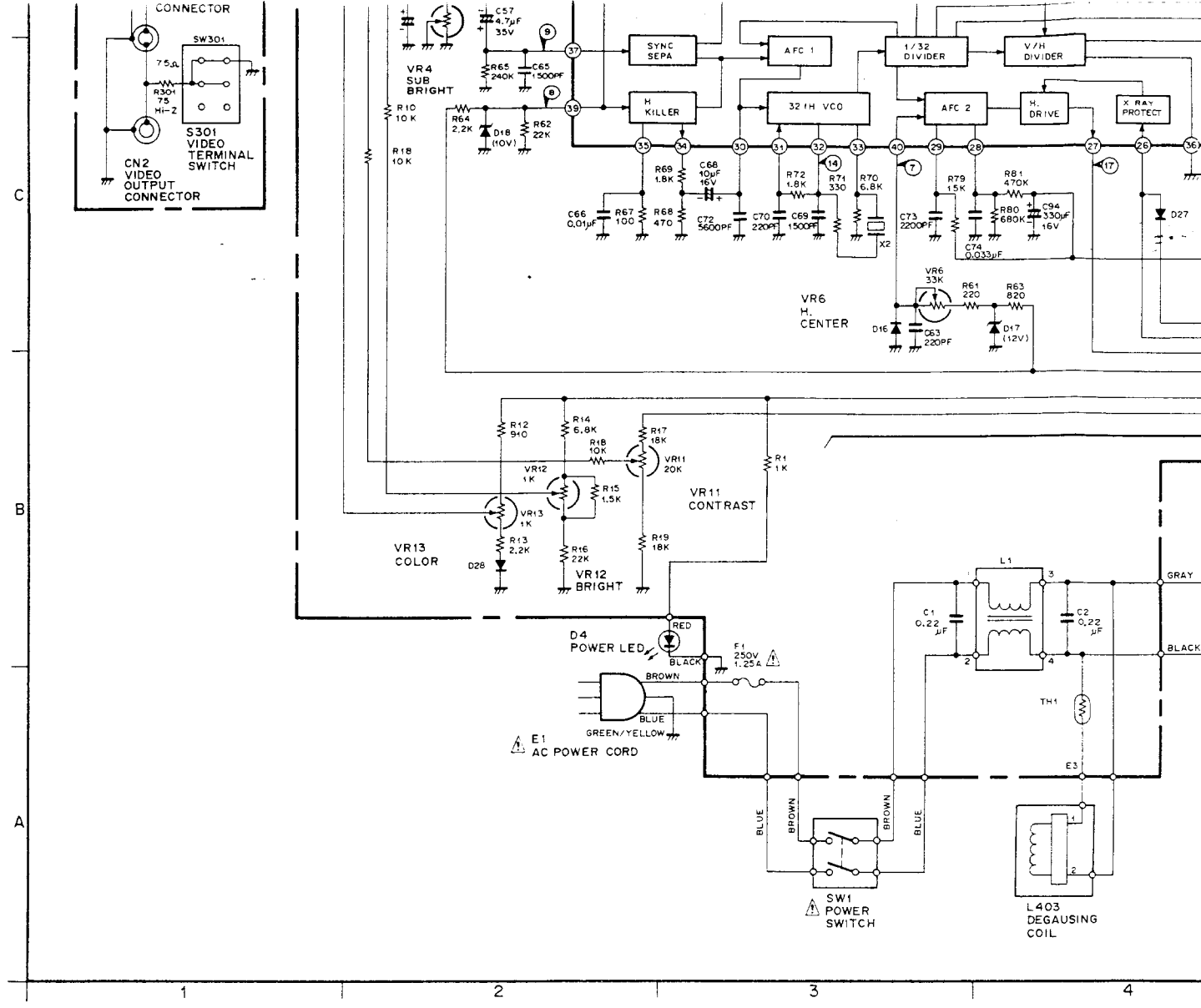

POWER / MONITOR BOARD
SIGNAL PROCESSI
REAR BOARD
CN301
NOT USED
GROUND
VIDEO OUT
CN1 VIDEO INPUT CONNECTOR
SW301
75Ω
R301 75 HI-Z
S301 VIDEO TERMINAL SWITCH
CN2 VIDEO OUTPUT CONNECTOR
VR14 PICTURE
R133 5.6K
VR14 1K
R134 3.9K
Q12 BUFFER
C36 220µF 16V
R37 33K
R39 1K
C35 47µF 16V
R38 22K
Q12
E6
G
VR5 SUB CONTRAST
C37 3.3µF 50V
R40 100K
C62 4.7µF 35V
VR5 220K
R52 220
C58 1µF 50V
VR4 330K
C57 4.7µF 35V
VR4 SUB BRIGHT
R65 240K
C65 1500PF
R10 10K
R64 2.2K
D18 (10V)
R62 22K
R18 10K
IC3
CLAMP
CONTRAST
B.G.P
VIDEO TONE
BRIGHT
BLK
Y AMP
GATE PULSE
B.G.P
SYNC SEPA
AFC 1
1/32 DIVIDER
V/H DIVIDER
H KILLER
32 fH VCO
AFC 2
H. DRIVE
X RAY PROTECT
R60 1.5K
L6
C106 27PF
R59 3.3K
R54 1.8K
C61 120PF
C60 220PF
R58 1.2K
R57 220
C93 10 PF
L5 56µH
L8 100 µH
C105 82PF
C97 2200PF
C21 0.01µF
C20 220µF 16V
R41 820
C38 47PF
R42 1K
C40 0.01µF
L4 6.8µH
C39 150PF
C67 4.7µF 35V
R73 1K
R69 1.8K
C68 10µF 16V
R72 1.8K
R71 330
R70 6.8K
C66 0.01µF
R67 100
R68 470
C72 5600PF
C70 220PF
C69 1500PF
X2
C73 2200PF
R79 1.5K
R81 470K
R80 680K
C94 330µF 16V
C74 0.033µF
D27
VR6 33K
R61 220
R63 820
D16
C63 220PF
D17 (12V)
VR6 H. CENTER
R12 910
R14 6.8K
R18 10K
R17 18K
VR11 20K
VR12 1K
R15 1.5K
VR13 1K
R13 2.2K
D28
R16 22K
R19 18K
R1 1K
VR11 CONTRAST
VR13 COLOR
VR12 BRIGHT
D4 POWER LED
RED
BLACK
F1 250V 1.25A
BROWN
BLUE
GREEN/YELLOW
E1 AC POWER CORD
L1
C1 0.22 µF
C2 0.22 µF
TH1
E3
BLUE
BROWN
BROWN
BLUE
SW1 POWER SWITCH
L403 DEGAUSING COIL
GRAY
BLAC

SCHEMATIC DIAGRAM OF COLOUR VIDEO MONITOR WV-CM140



4 5 6 7


CRT SOCKET BOARD
S201 SERVICE SWITCH
C
R
NORMAL (N)
SERVICE (S)
Q31 ~ Q35 COLOR CONTROL
Q20 BUFFER
Q34
Q35
Q33
Q20
VR10 5K
R95 1K (1W)
ON CIRCUIT
Q18 SWITCHING
BI4 (E4)
CN201
1 CRT CATHODE OUT
2 Y SIGNAL OUT
3 SERVICE SWITCH IN
4 RED OUT
5 GREEN OUT
6 BLUE OUT
7 CRT HEATER OUT
8 GROUND
CRT CATHODE IN
Y SIGNAL IN
SERVICE SWITCH OUT
RED IN
GREEN IN
BLUE IN
CRT HEATER IN
GROUND
L201 150μH
Q203
Q202
Q201
TP202 (R OUT)
TP201 (G OUT)
TP203 (B OUT)
VR203 R DRIVE
VR204 R LOW LIGHT
VR201 B DRIVE
VR202 B LOW LIGHT
Q203 RED OUTPUT
Q202 GREEN OUTPUT
Q201 BLUE OUTPUT
CN1
1 V. DEFLECTION (+)
2 V. DEFLECTION (−)
L401 DEFLECTION COIL
L401-1 V. DEF.
L401-2 H. DEF.
300Ω
Q8
Q9
VR3 V. SIZE
VR2 V. CENTER
Q8, Q9 AMP
CN2
3 H. DEFLECTION (+)
2 NOT USED
1 H. DEFLECTION (−)
PL201
C201 680PF 2KV
CN 202
E1
E2
BLACK
HIGH VOLTAGE CIRCUIT
T3
RED
WHITE
ORANGE
VR9 FOCUS
VR15 SCREEN
D20
D19
V1 CATHODE RAY TUBE (CRT)



<ADDRESS INFORMATION>

POWER/MONITOR BOARD

REF No.	ADDRESS
IC1	A5
IC2	A5
IC3	D4
IC4	D7
Q 4	B6
Q 5	B6
Q 8	C8
Q 9	C8
Q10	B7
Q11	B7
Q12	D2
Q14	C7
Q17	C7
Q18	D8
Q20	E8
Q22	D6
Q23	E6
Q24	A7
Q25	C7
Q30	E7
Q31	E7
Q32	E7
Q33	E8
Q34	E8
Q35	E8
D 1	B5
D 2	A5
D 3	A5
D 4	B3
D 5	B6
D 6	B6
D13	A7
D14	A7
D16	C3
D17	C4
D18	C2
D19	A8
D20	B8
D22	D7
D26	A7
D27	C4
D28	B2
D31	E7

CRT SOCKET BOARD

REF No.	ADDRESS
Q201	D10
Q202	D10
Q203	E10

<VOLTAGES>

	Q4	Q5	Q8	Q9	Q10	Q11	Q12	Q14	Q17	Q18	Q20
B	142	110	0	0	0.3	0	5.2	12.8	0	0	5.9
C	117	142	23.6	0	82.7	38.0	0	3.7	3.3	0.9	0
E	143	110	8.2	8.3	0	0	5.9	12.0	0	0	6.5

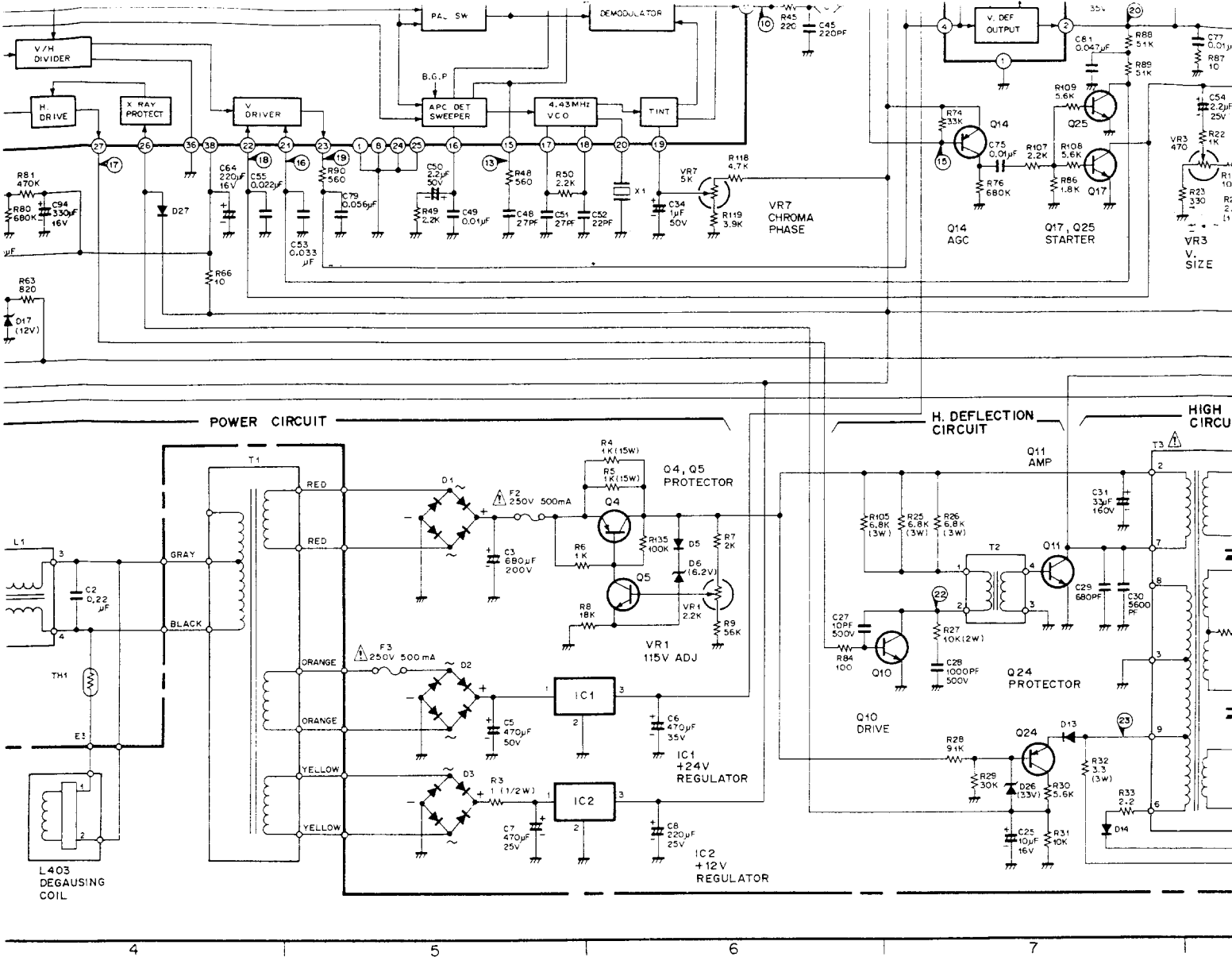
	Q22	Q23	Q24	Q25	Q30	Q31	Q32	Q33	Q34	Q35
B	0.1	8.5	28.8	0	11.2	11.2	9.2	0.9	0	5.2
C	0	0	0	0.2	12.0	0	6.0	0	5.2	12.0
E	0	9.2	20.3	0	10.7	9.9	9.9	0	0	4.6

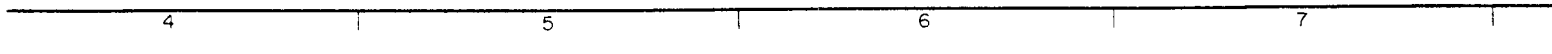
				IC3			
Pin 1	0	Pin 13	7.0	Pin25	0	Pin37	8.3
2	4.8	14	12.0	26	0	38	12.0
3	4.6	15	5.1	27	0.4	39	0.7
4	8.5	16	5.8	28	7.4	40	1.0
5	8.5	17	9.0	29	6.2	41	4.0
6	4.7	18	9.0	30	3.3	42	2.4
7	4.3	19	5.8	31	4.8	43	9.2
8	0	20	5.3	32	4.8	44	9.8
9	4.3	21	0.3	33	9.7	45	5.6
10	11.3	22	3.4	34	0	46	8.2
11	7.0	23	0.9	35	0	47	0.1
12	7.0	24	0	36	0	48	5.9

	IC1	IC2	IC4
Pin 1	---	18.6	0
2	0	0	11.3
3	24.0	12.0	24.0
4			0.9
5			0
6			23.6
7			2.4

CRT SOCKET BOARD

	Q201	Q202	Q203
B	7.0	7.1	7.0
C	112	110	112
E	7.0	7.1	7.1

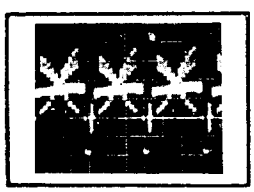




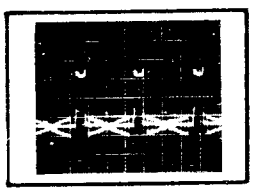
<WAVEFORMS>

	0	Pin37	8.3
	0	38	12.0
	0.4	39	0.7
	7.4	40	1.0
	6.2	41	4.0
	3.3	42	2.4
	4.8	43	9.2
	4.8	44	9.8
	9.7	45	5.6
	0	46	8.2
	0	47	0.1
	0	48	5.9

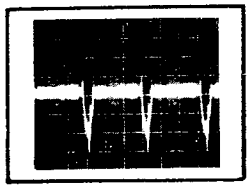
1. 0.2V/DIV,20μs/DIV



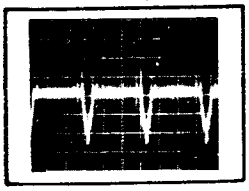
2. 2V/DIV,20μs/DIV



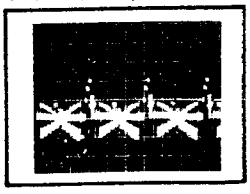
3. 50mV/DIV,20μs/DIV



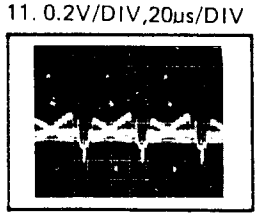
4. 50mV/DIN,20μs/DIV



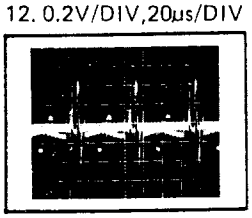
5. 0.5V/DIV,20μs/DIV



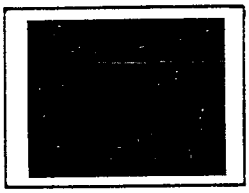
11. 0.2V/DIV,20μs/DIV



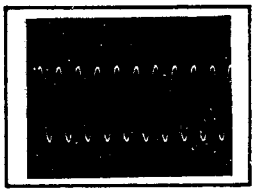
12. 0.2V/DIV,20μs/DIV



13. 0.2V/DIV.20μs/DIV



14. 0.2V/DIV,2μs/DIV

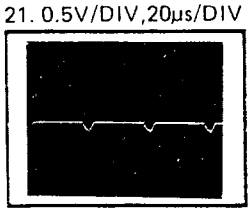


15. 0.2V/DIV,20μs/DIV

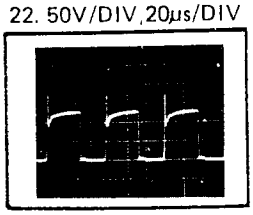
RT SOCKET BOARD

	Q201	Q202	Q203
	7.0	7.1	7.0
	112	110	112
	7.0	7.1	7.1

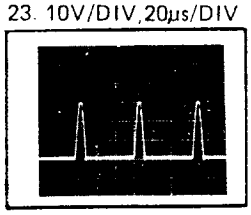
21. 0.5V/DIV,20μs/DIV



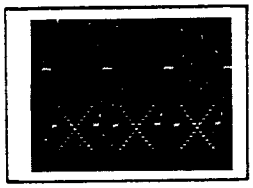
22. 50V/DIV,20μs/DIV



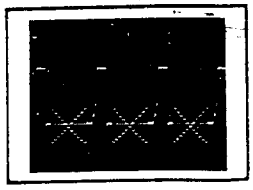
23. 10V/DIV,20μs/DIV

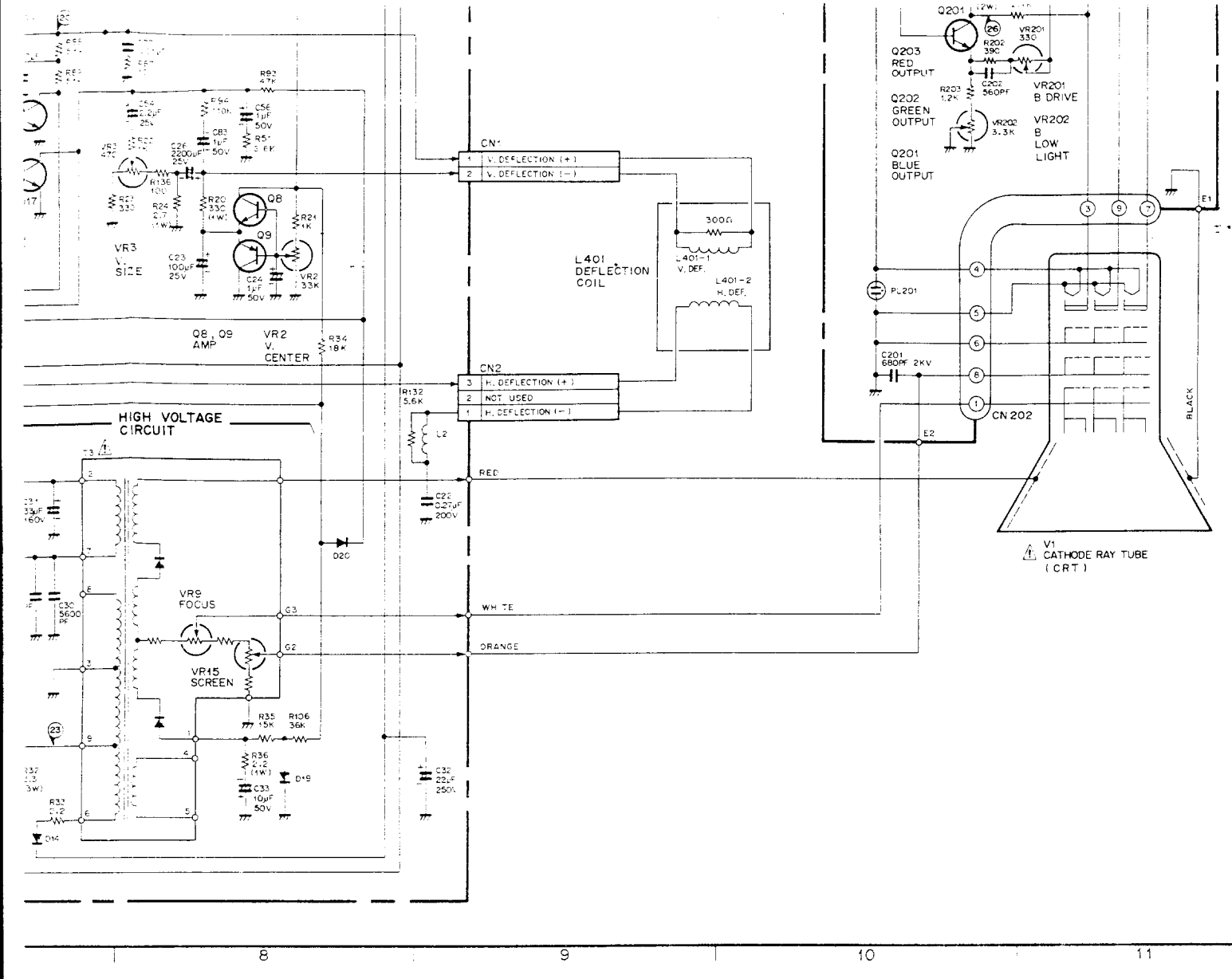


24. 20V/DIV,20μs/DIV

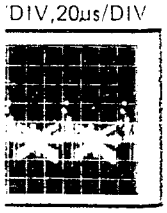


25. 20V/DIV,20μs/DIV

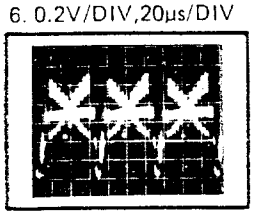




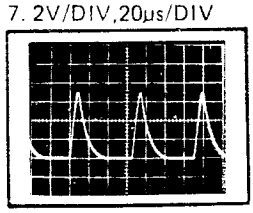
'DIV,20μs/DIV



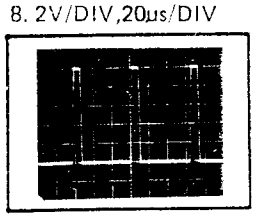
6. 0.2V/DIV,20μs/DIV



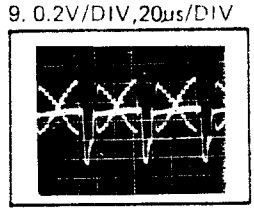
7. 2V/DIV,20μs/DIV



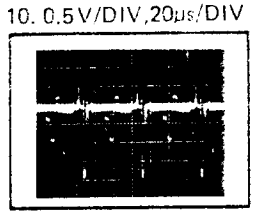
8. 2V/DIV,20μs/DIV



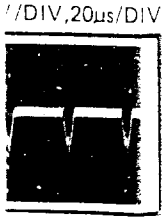
9. 0.2V/DIV,20μs/DIV



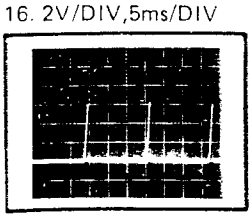
10. 0.5V/DIV,20μs/DIV



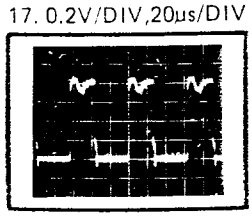
'/DIV,20μs/DIV



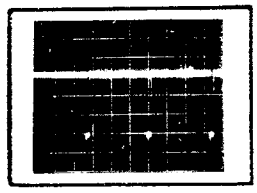
16. 2V/DIV,5ms/DIV



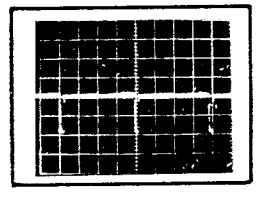
17. 0.2V/DIV,20μs/DIV



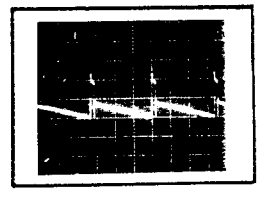
18. 1V/DIV.5ms/DIV



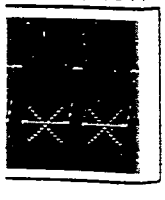
19. 0 5V/DIV,5ms/DIV



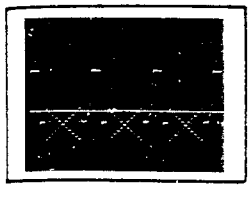
20. 20V/DIV,5ms/DIV



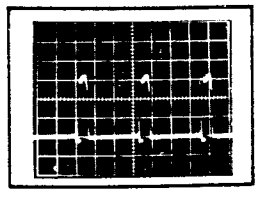
'DIV,20μs/DIV



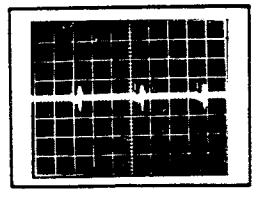
26. 20V/DIV,20μs/DIV



27. 0.2V/DIV,20μs/DIV



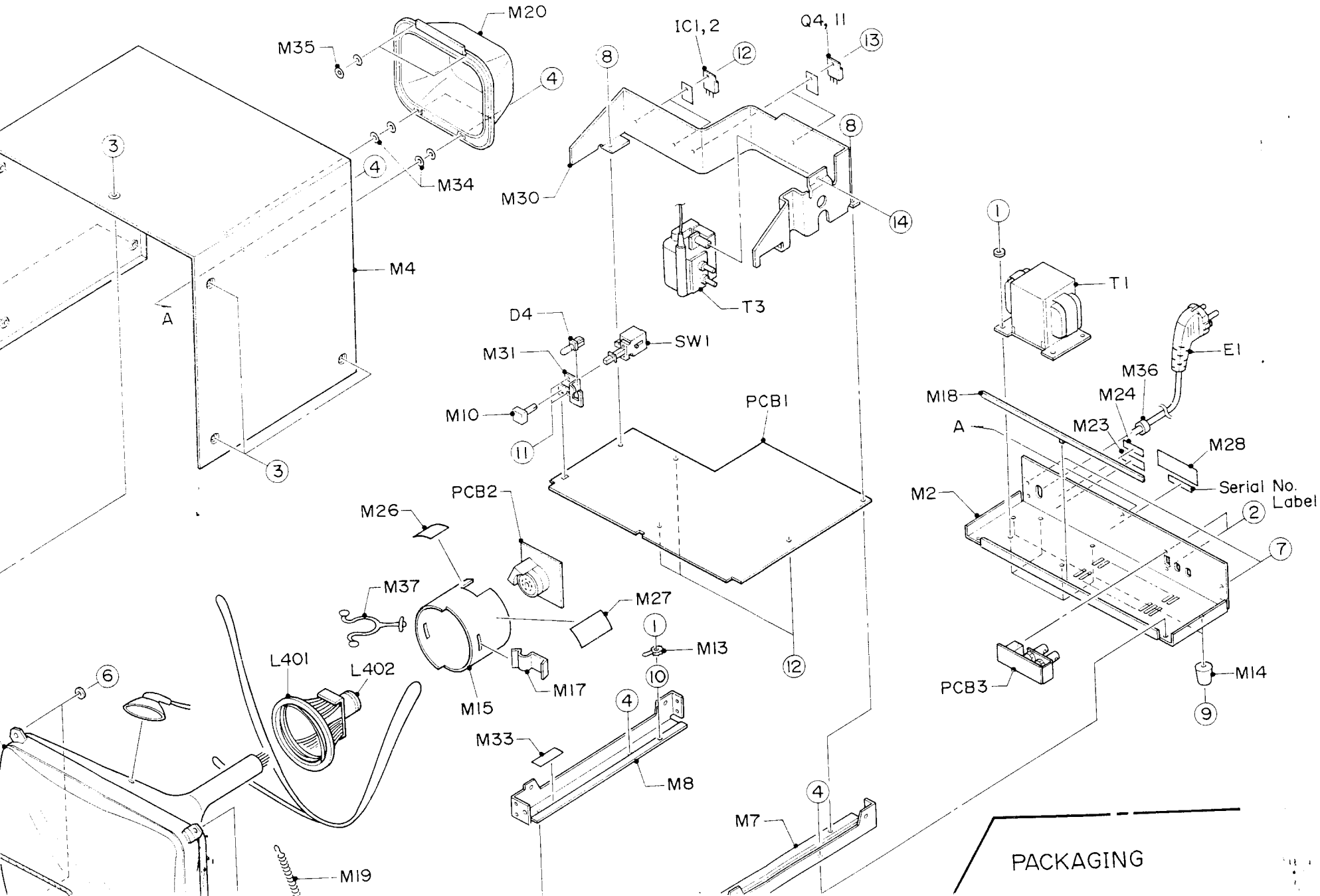
28. 0.5V/DIV,20μs/DIV



PRODUCT SAFETY NOTICE

COMPONENT IDENTIFIED WITH THE " ⚠ " MARK HAVE THE SPECIA
CHARACTERISTICS FOR SAFETY.
WHN SERVICING ANY OF THESE COMPONENTS, IT IS ESSENCIAL THA
ONLY MANUFACTURE'S SPECIFIED PARTS BE USED

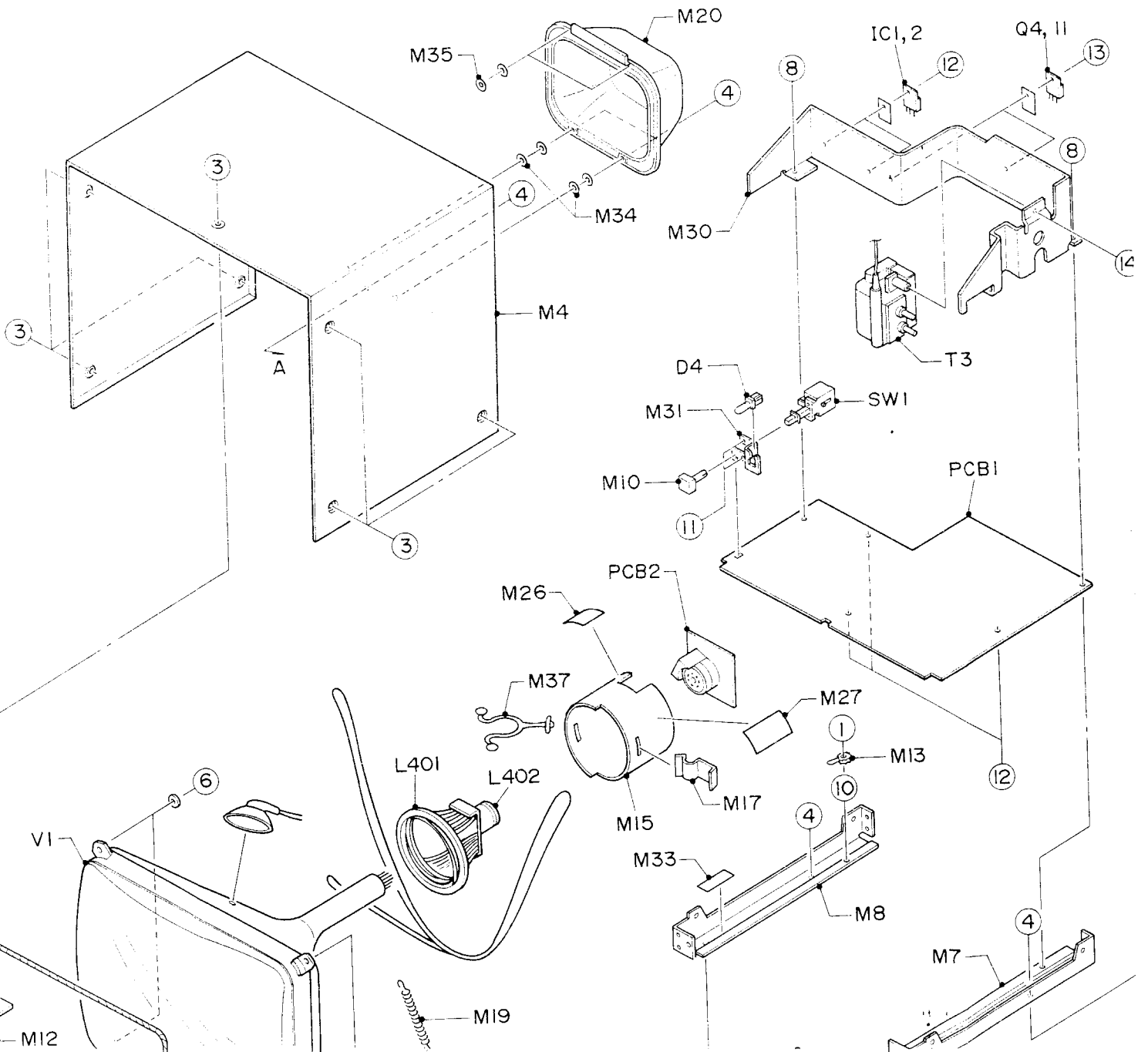
EXPLODED VIEW OF COLOUR VIDEO MONITOR WV-CM140



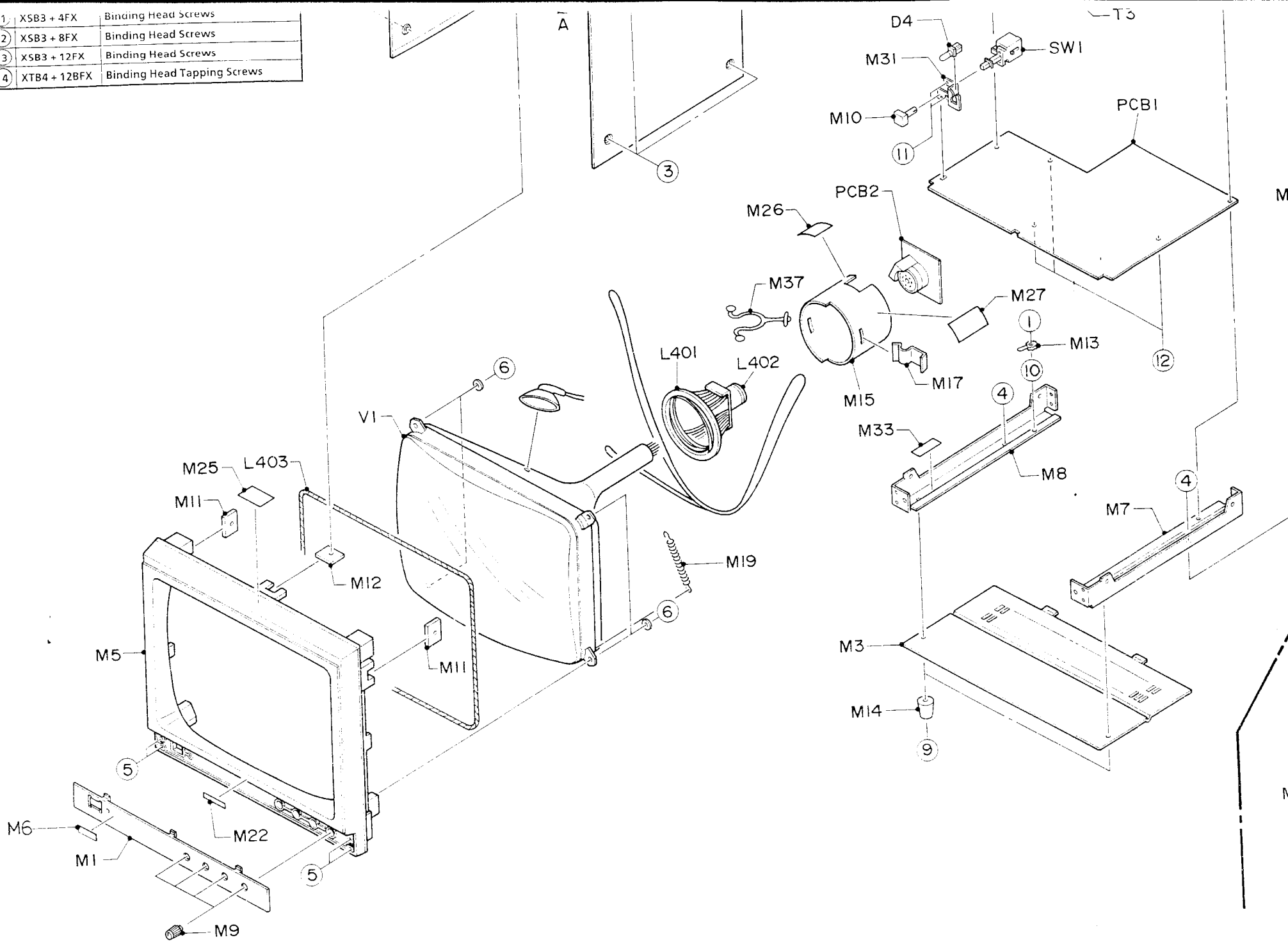
EXPLODED VIEW OF COLOUR VIDEO MONITOR WV-CM140

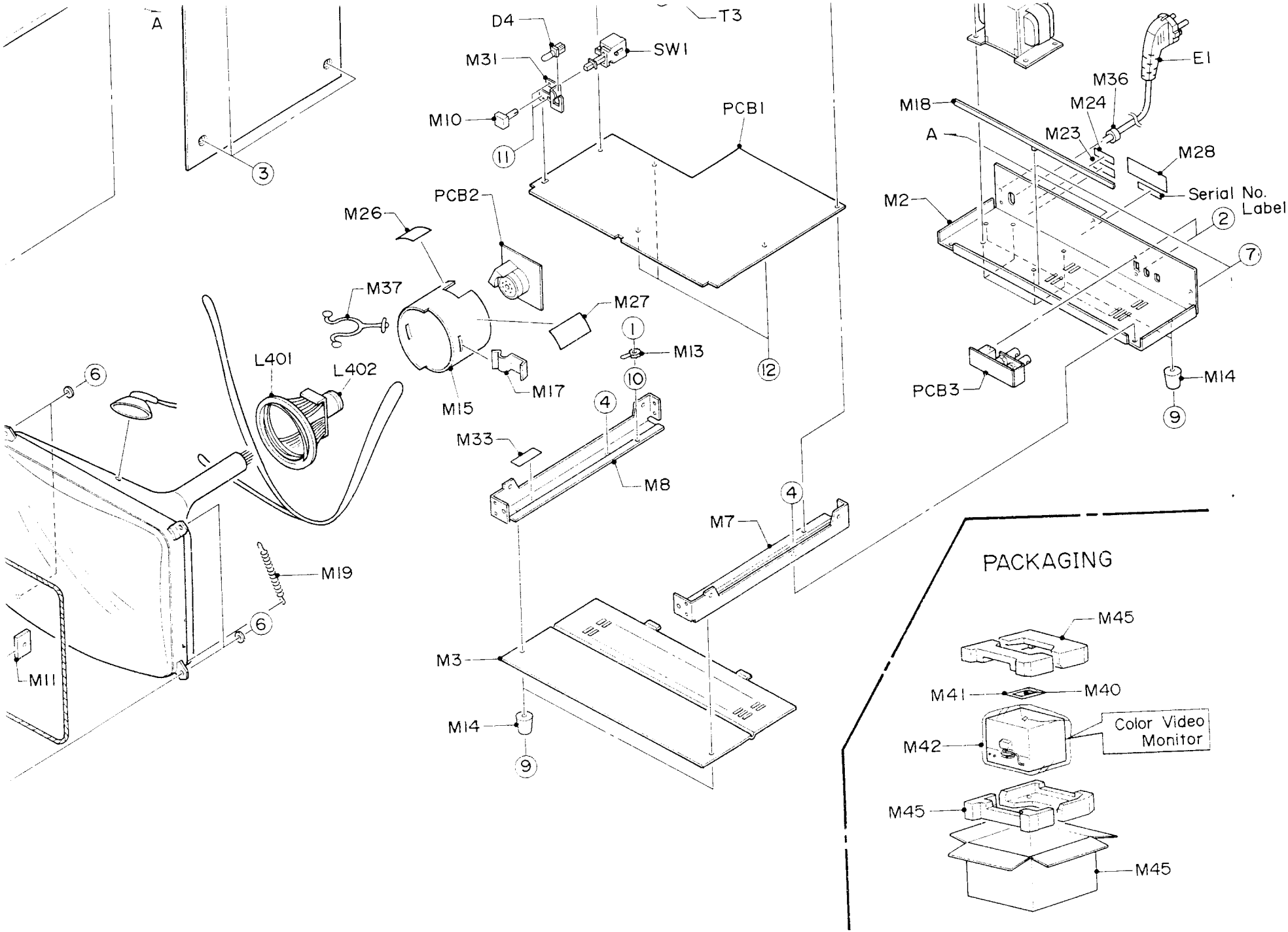
Numbers show screws.

No.	Screws	Description
1	XSB4 + 6FX	Binding Head Screws
2	XSB26 + 4FXK	Binding Head Black Screws
3	XSB4 + 6FXK	Binding Head Black Screws
4	XTB3 + 6FX	Binding Head Tapping Screws
5	XTB3 + 8FX	Binding Head Tapping Screws
6	XTB4 + 20BFX	Binding Head Tapping Screws
7	XTB3 + 6FXK	Binding Head Tapping Black Screws
8	XTB3 + 8FXV	Binding Head Tapping Violet Screws
9	XTB3 + 12FX	Binding Head Tapping Screws
10	XWC4BFX	External Toothed Lock Washer
11	XSB3 + 4FX	Binding Head Screws
12	XSB3 + 8FX	Binding Head Screws
13	XSB3 + 12FX	Binding Head Screws
14	XTB4 + 12BFX	Binding Head Tapping Screws

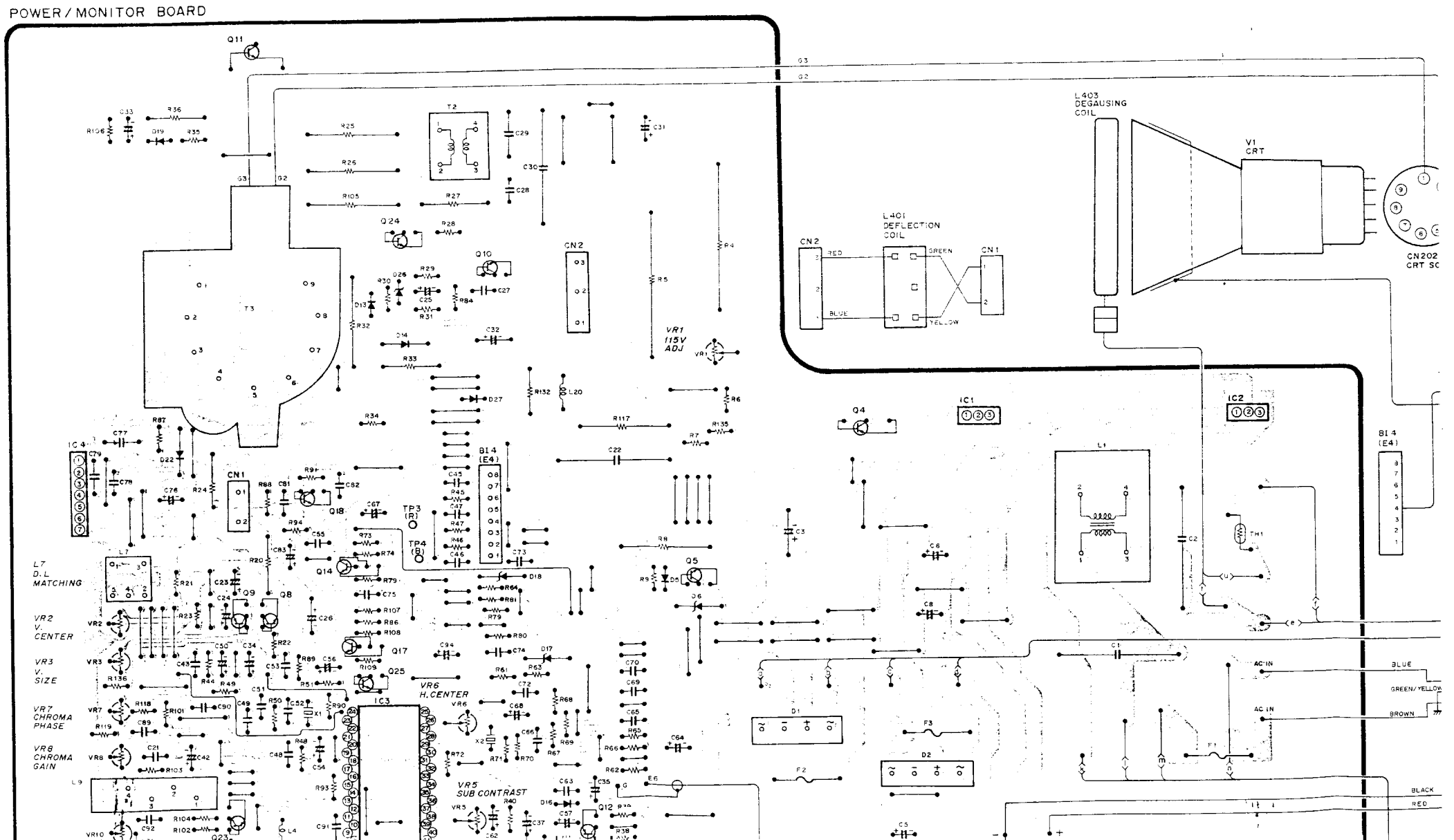


(11)	XSB3 + 4FX	Binding Head Screws
(12)	XSB3 + 8FX	Binding Head Screws
(13)	XSB3 + 12FX	Binding Head Screws
(14)	XTB4 + 12BFX	Binding Head Tapping Screws

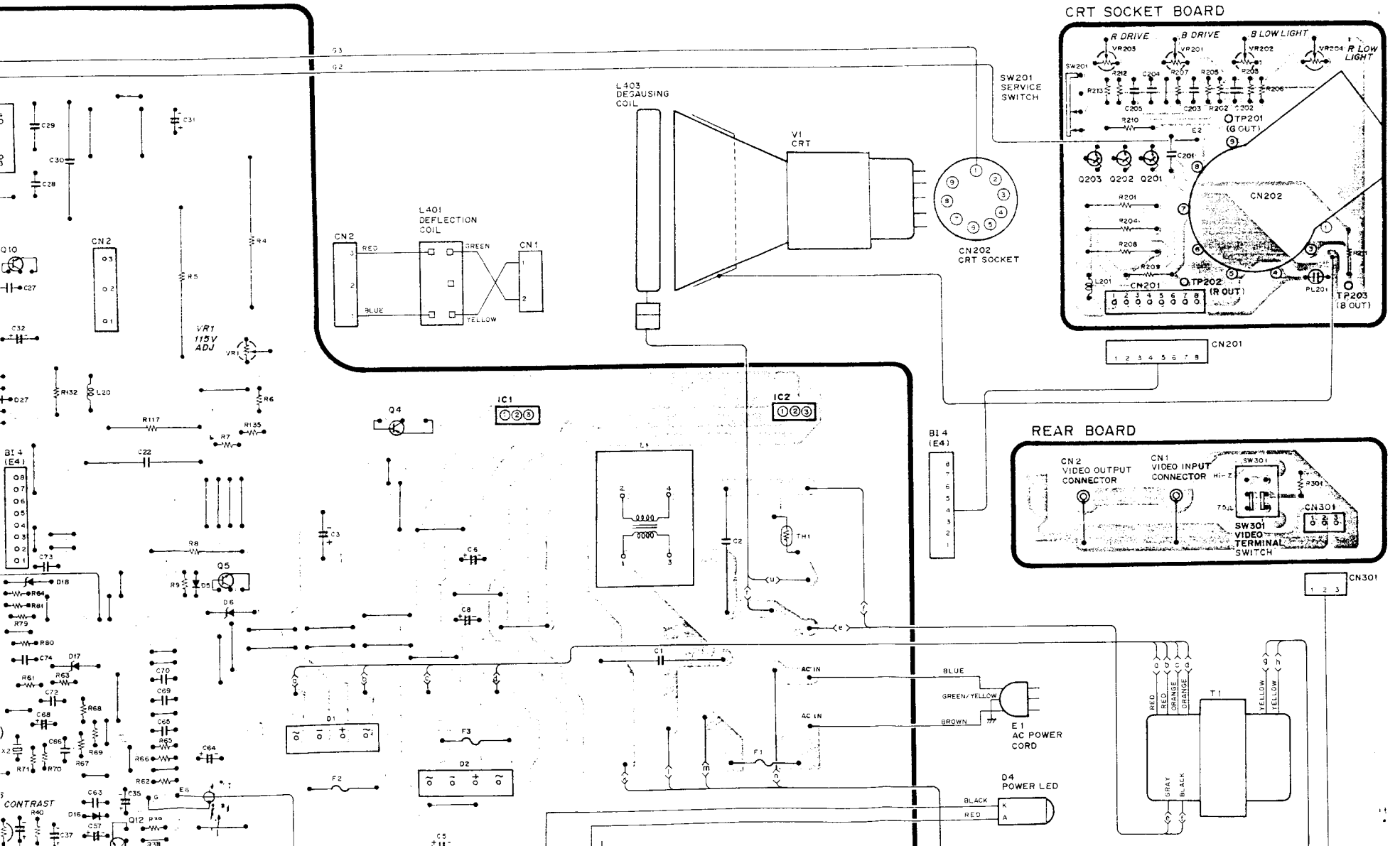



A
3
D4
M31
M10
11
T3
SW1
PCB1
M18
A
M36
M24
M23
E1
M28
Serial No. Label
M2
2
7
M26
PCB2
M37
M27
1
M13
10
12
L401
L402
6
M15
M17
4
M33
M8
M7
4
M19
6
M11
M3
M14
9
PCB3
M14
9
PACKAGING
M45
M41
M40
M42
Color Video Monitor
M45
M45

CONDUCTOR VIEW OF COLOUR VIDEO MONITOR WV-CM140



CONDUCTOR VIEW OF COLOUR VIDEO MONITOR WV-CM140



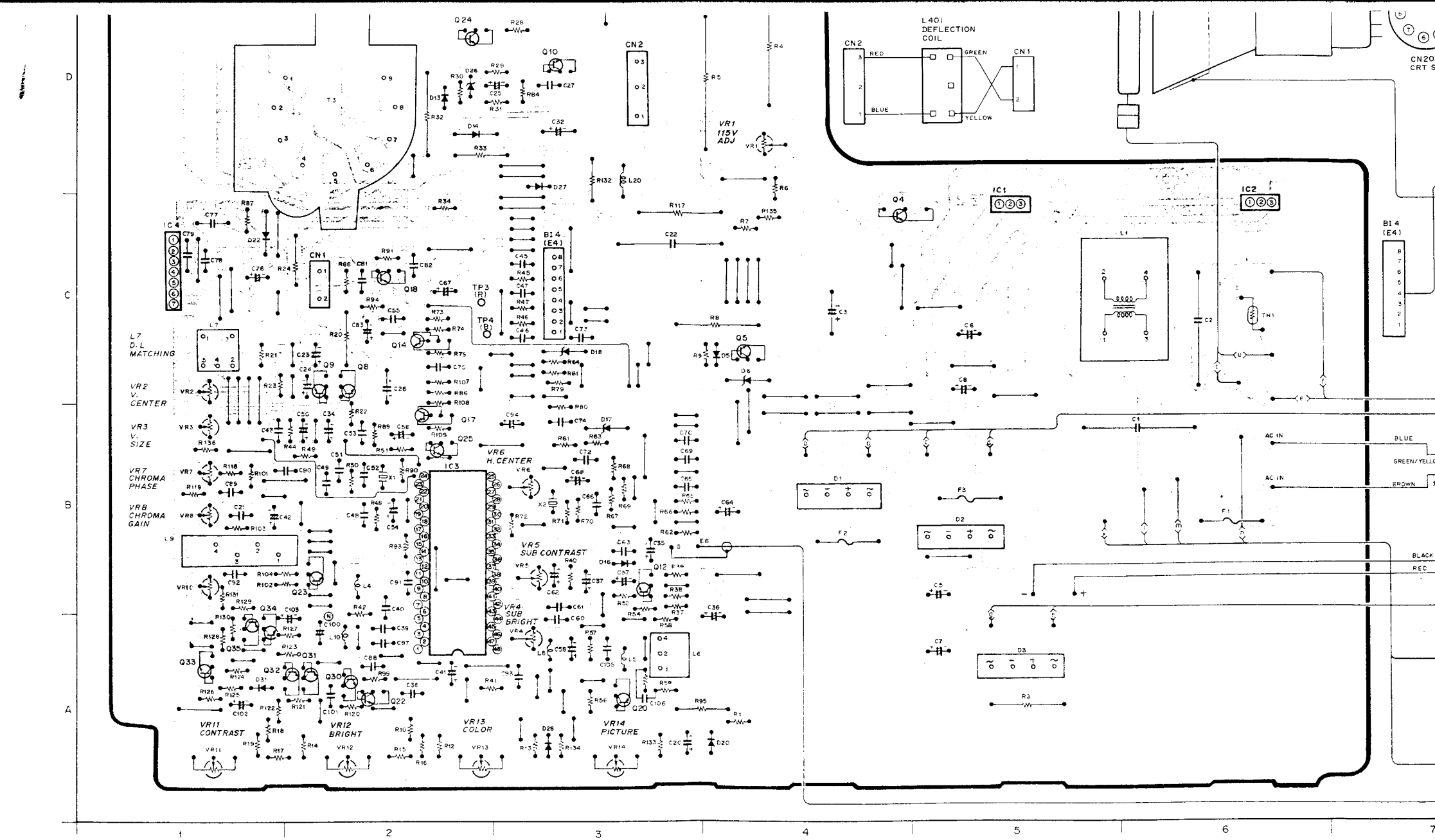
< ADDRESS INFORMATION >

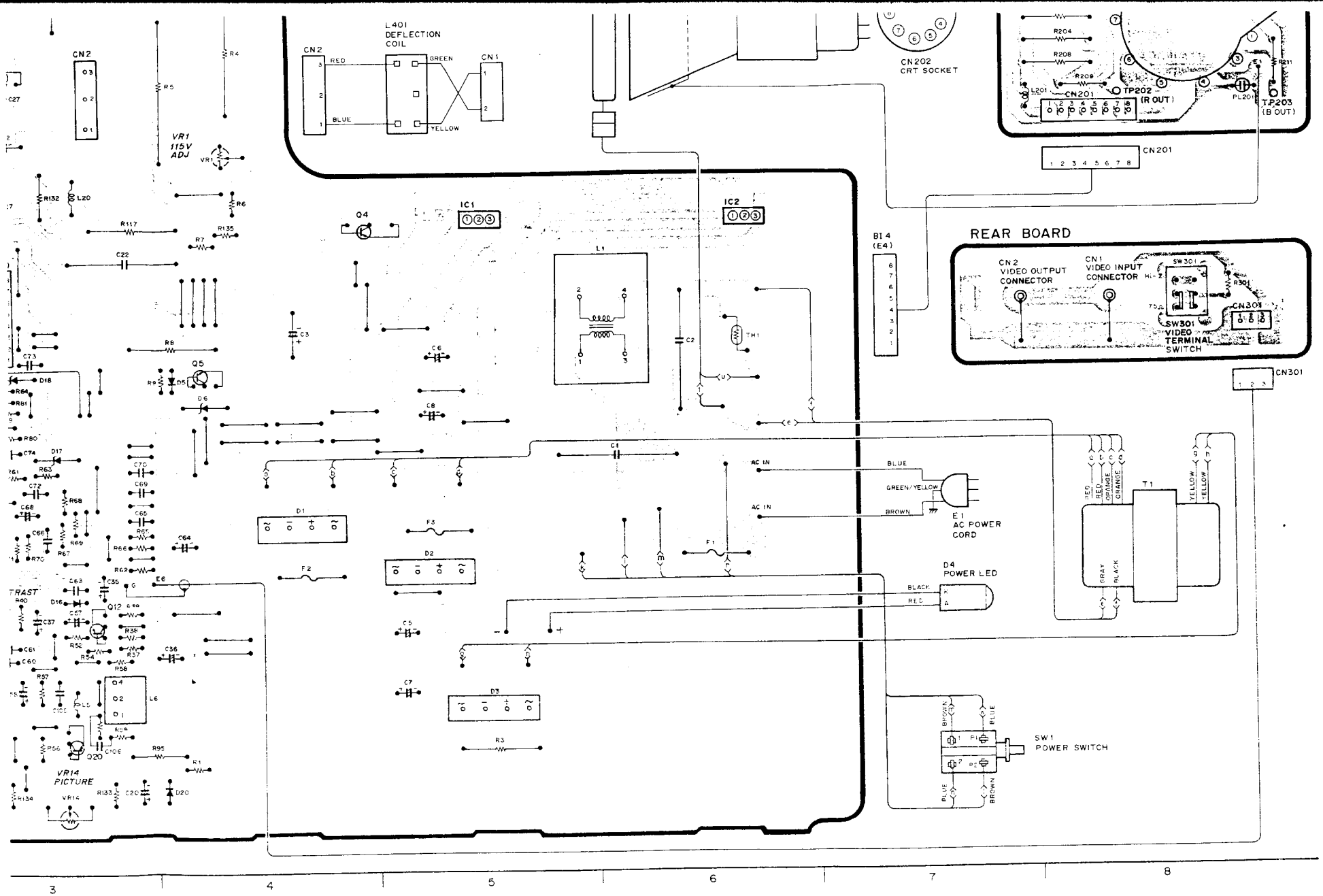
POWER/MONITOR BOARD

REF No.	ADDRESS
IC1	C5
IC2	C6
IC3	B2
IC4	C1
Q 4	C4
Q 5	C4
Q 8	C2
Q 9	C2
Q10	D3
Q11	E2
Q12	B3
Q14	C2
Q17	B2
Q18	C2
Q20	A3
Q22	A2
Q23	B2
Q24	D2
Q25	B2
Q30	A2
Q31	A2
Q32	A2
Q33	A1
Q34	A1
Q35	A1
D 1	B4
D 2	B5
D 3	A5
D 4	B5
D 5	C4
D 6	C4
D13	D2
D14	D2
D16	B3
D17	B3
D18	C3
D19	E1
D20	A4
D22	C1
D26	D2
D27	D3
D28	A3
D31	A1

CRT SOCKET BOARD

REF No.	ADDRESS
Q201	E8
Q202	E8
Q203	E7


L401
DEFLECTION
COIL
CN2
RED
BLUE
GREEN
YELLOW
CN1
VR1
115V
ADJ
IC1
IC2
IC4
BI4
(E4)
L7
D.L
MATCHING
VR2
V.
CENTER
VR3
V.
SIZE
VR7
CHROMA
PHASE
VR8
CHROMA
GAIN
VR6
H.CENTER
VR5
SUB CONTRAST
VR4
SUB
BRIGHT
VR11
CONTRAST
VR12
BRIGHT
VR13
COLOR
VR14
PICTURE
TP3
(R)
TP4
(B)
IC3
L1
TH1
D1
D2
D3
F1
F2
F3
AC IN
AC IN
BLUE
GREEN/YELLO
BROWN
BLACK
RED
CN20
CRT S
1
2
3
4
5
6
7
A
B
C
D



Q32	A2
Q33	A1
Q34	A1
Q35	A1
D 1	B4
D 2	B5
D 3	A5
D 4	B5
D 5	C4
D 6	C4
D13	D2
D14	D2
D16	B3
D17	B3
D18	C3
D19	E1
D20	A4
D22	C1
D26	D2
D27	D3
D28	A3
D31	A1

CRT SOCKET BOARD

REF No.	ADDRESS
Q201	E8
Q202	E8
Q203	E7

REPLACEMENT PARTS LIST

Important Notice

1. Components identified by "⚠" mark have special characteristics important for safety.
   When replacing any of these components, use only manufacturer's specified parts.
2. Printed circuit board assembly with mark (NLA) is no longer available after production discontinuation of the complete set.

REF.NO.	PART NO.	DESCRIPTION
MISCELLANEOUS		
V1 ⚠	A34JRD90X	Cathode Ray Tube
L401	KY10292M	Deflection Coil
L402	ETC26X1S	Magnet Coil
L403	KAVM140	Coil
T1 ⚠	YWPT1070E02	Power Transformer
SW1 ⚠	YWESB99682V	Push Switch
CN1,2	31-10T	BNC Connector
E1 ⚠	YFKPGTSA25	AC Power Cord for WV-CM140/A
⚠	YFHBS308B	AC Power Cord for WV-CM140/B
⚠	YWCE009908FA	AC Power Cord for WV-CM140/C
⚠	YWVM009908A	AC Power Cord for WV-CM140/G
M1	YWV5WA0901A3	Operating Panel
M2	YWV5EA0658A2	Rear Cover
M3	YWV5EA0659A3	Bottom Cover
M4	YWV5KA0816A2	Upper Case
M5	YWV5BA0064A1	Escutcheon
M6	YFV5DA0024A4	Ornament
M7	YWV2KA0497A3	Chassis
M8	YWV2KA0499A3	Chassis
M9	YFV5RA0056A4	Knob (X4)
M10	YWV6JB0034A4	Button
M11	YFV2CA0005A4	Hold Plate A (X2)
M12	YFV2CA0006A4	Hold Plate B
M13	YW-BCG-EM01	Earth Lag
M14	YWS-WB02	Rubber Foot
M15	YWV2HA0427B3	Shield Parts
M16	YFV2NA0044B4	Spacer for York
M17	YFV2NA0073A4	Spacer
M18	YWV2PA0303A4	Insulator for Rear Plate
M19	YFV4JA0118A4	CRT Earth Spring
M20	YFV6BA0010A2	CRT Hood
M21	YFV2VA0001A4	Earth Plate
M22	NA-538PB7	Badge
M23 ⚠	YWV7MA0015A4	Caution Label for WV-CM140/G
M24	YFV7MA0081A4	Earth Label for WV-CM140/G
M25 ⚠	YFV7MA0166B4	X-Ray Label for WV-CM140/G
M26 ⚠	YWV7MA0167A4	Sarvice Man Label
M27 ⚠	YFV7MA0192A4	Higth Voltage Label for WV-CM140/G
M28 ⚠	YWV7QA1740A4	Main Label for WV-CM140/B
⚠	YWV7QA1753A4	Main Label for WV-CM140/A
⚠	YWV7QA1754A4	Main Label for WV-CM140/C
⚠	YWV7QA1755A4	Main Label for WV-CM140/G
M33	YWS-CULRB03	Fuse Label
M34	YFV1KA0015A4	Washer
M35	YFV1KA0021A4	Washer
M36	YWSR6W-1	Cord Clamp
M37	CLIP0534	Support
POWER/MONITOR BOARD		
PCB1 (NLA)	YWVKBM140E1A	Printed Circuit Board assy
IC1	AN78M24	IC
IC2	AN78M12	IC
IC3	UPC1420CA	IC
IC4	UPC1378H	IC
Q4	2SB817E	Transistor
Q5	2SC2591QRS	Transistor
Q8	2SD639RS	Transistor
Q9	2SB644-QRS	Transistor
Q10	2SC1573BQR	Transistor
Q11	2SD1439LS	Transistor
Q12,14	2SB641-QR	Transistor
Q17,18	2SD636-QRS	Transistor
Q20	2SB643-RS	Transistor
Q22	2SD636-QRS	Transistor
Q23	2SB641-QR	Transistor
Q24	2SB642-QRS	Transistor
Q25	2SD636-QRS	Transistor
Q30	2SD637-RS	Transistor
Q31,32	2SB642-QRS	Transistor
Q33-35	2SD637-RS	Transistor
D1	YWRB154	Diode
D2	RB152	Rectifier
D3	RB150	Diode
D4	LN21RPH	LED (Red)
D5	MA150	Diode
D6	RD6.2JT1B2	Diode
D13	MA162	Diode
D14	EU01V0	Diode
D16	MA165	Diode
D17	RD12ESB3T	Diode

REF.NO.	PART NO.	DESCRIPTION	
D18	RD10ESB3T	Diode	
D19,20	MA165	Diode	
D22	ERB1201RK	Diode	
D26	YWRD30JSB3	Diode	
D27,28	MA165	Diode	
D31	MA165	Diode	
TH1	ERPZ5B0N180A	Thermistor	
R1	ERDS2TJ102	Carbon	1K ohms 1/4W
R3 ⚠	ERQ12HJ1R0	Fuse Resistor	1 ohms 1/4W
R4,5	ERF15ZYJ102	Metal	1K ohms
R6	ERDS2TJ102	Carbon	1K ohms 1/4W
R7	ERDAS2CF2001	Metal	2K ohms 1/4W
R8	ERG3SJ183P	Metal	18K ohms 3W
R9	ERDAS2CF5602	Metal	56K ohms 1/4W
R10	ERDS2TJ103	Carbon	10K ohms 1/4W
R12	ERDS2TJ911	Carbon	910 ohms 1/4W
R13	ERDS2TJ222	Carbon	2.2Kohms1 /4W
R14	ERDS2TJ682	Carbon	6.8K ohms 1/4W
R15	ERDS2TJ152	Carbon	1.5K ohms 1/4W
R16	ERDS2TJ223	Carbon	22K ohms 1/4W
R17	ERDS2TJ183	Carbon	18K ohms 1/4W
R18	ERDS2TJ103	Carbon	10K ohms 1/4W
R19	ERDS2TJ183	Carbon	18K ohms 1/4W
R20	ERG1SJ331	Metal	330 ohms 1W
R21	ERDS2TJ102	Carbon	1K ohms 1/4W
R22	ERDAS2CF1001	Metal	1K ohms 1/4W
R23	ERDAS2CF3300	Metal	3.3K ohms 1/4W
R24	ERX1SJ2R7P	Metal	2.7 ohms 1W
R25,26	ERG3SJ682P	Metal	6.8K ohms 3W
R27	ERG2SJ103	Metal	10K ohms 2W
R28	ERDAS2CF9102	Metal	91K ohms 1/4W
R29	ERDAS2CF3002	Metal	30K ohms 1/4W
R30	ERDS2TJ562	Carbon	5.6K ohms 1/4W
R31	ERDS2TJ103	Carbon	10K ohms 1/4W
R32	ERX3SG3R3P	Fuse Resistor	3.3 ohms 3W
R33	ERQ14AJ2R2	Fuse Resistor	2.2 ohms 3W
R34	ERDS2TJ183	Carbon	18K ohms 1/4W
R35	ERDS2TJ153	Carbon	15K ohms 1/4W
R36	ERX1SJ2R2P	Metal	2.2 ohms 1W
R37	ERDS2TJ333	Carbon	33K ohms 1/4W
R38	ERDS2TJ223	Carbon	22K ohms 1/4W
R39	ERDS2TJ102	Carbon	1K ohms 1/4W
R40	ERDS2TJ104	Carbon	100K ohms 1/4W
R41	ERDS2TJ821	Carbon	820 ohms 1/4W
R42	ERDS2TJ102	Carbon	1K ohms 1/4W
R44	ERDS2TJ684	Carbon	680K ohms 1/4W
R45-47	ERDS2TJ221	Carbon	220 ohms 1/4W
R48	ERDS2TJ561	Carbon	560 ohms 1/4W
R49,50	ERDS2TJ222	Carbon	2.2K ohms 1/4W
R51	ERDS2TJ362	Carbon	3.6K ohms 1/4W
R52	ERDS2TJ221	Carbon	220 ohms 1/4W
R54	ERDAS2CF1801	Metal	1.8K ohms 1/4W
R56	ERDS2TJ561	Carbon	560 ohms 1/4W
R57	ERDAS2CF2200	Metal	2.2K ohms 1/4W
R58	ERDAS2CF1202	Metal	12K ohms 1/4W

REF.NO.	PART NO.	DESCRIPTION	
R59	ERDAS2CF3301	Metal	3.3K ohms 1/4W
R60	ERDAS2CF1501	Metal	1.5K ohms 1/4W
R61	ERDS2TJ221	Carbon	220 ohms 1/4W
R62	ERDS2TJ223	Carbon	22K ohms 1/4W
R63	ERDS2TJ821	Carbon	820 ohms 1/4W
R64	ERDS2TJ222	Carbon	2.2K ohms 1/4W
R65	ERDS2TJ244	Carbon	240K ohms 1/4W
R66	ERD2FCG100	Carbon	10 ohms 2W
R67	ERDS2TJ101	Carbon	100 ohms 1/4W
R68	ERDS2TJ471	Carbon	470 ohms 1/4W
R69	ERDS2TJ182	Carbon	1.8K ohms 1/4W
R70	ERDS2TJ682	Carbon	6.8K ohms 1/4W
R71	ERDS2TJ331	Carbon	330 ohms 1/4W
R72	ERDS2TJ182	Carbon	1.8K ohms 1/4W
R73	ERDS2TJ102	Carbon	1K ohms 1/4W
R74	ERDS2TJ333	Carbon	33K ohms 1/4W
R76	ERDS2TJ684	Carbon	680K ohms 1/4W
R79	ERDS2TJ153	Carbon	15K ohms 1/4W
R80	ERDS2TJ684	Carbon	680K ohms 1/4W
R81	ERDS2TJ474	Carbon	470K ohms 1/4W
R84	ERDS2TJ101	Carbon	100 ohms 1/4W
R86	ERDS2TJ182	Carbon	1.8K ohms 1/4W
R87	ERDS2TJ100	Carbon	10 ohms 1/4W
R88,89	ERDAS2CF5102	Metal	51K ohms 1/4W
R90	ERDS2TJ561	Carbon	560 ohms 1/4W
R91	ERDS2TJ223	Carbon	22K ohms 1/4W
R93	ERDS2TJ473	Carbon	47K ohms 1/4W
R94	ERDS2TJ114	Carbon	110K ohms 1/4W
R95	ERG1SJ102P	Metal	1K ohms 1W
R99	ERDS2TJ103	Carbon	10K ohms 1/4W
R101	ERDS2TJ391	Carbon	390 ohms 1/4W
R102	ERDS2TJ103	Carbon	10K ohms 1/4W
R103	ERDS2TJ471	Carbon	470 ohms 1/4W
R104	ERDS2TJ391	Carbon	390 ohms 1/4W
R105	ERG3SJ682P	Metal	6.8K ohms 3W
R106	ERDS2TJ363	Carbon	36K ohms 1/4W
R107	ERDS2TJ222	Carbon	2.2K ohms 1/4W
R108,109	ERDS2TJ562	Carbon	5.6K ohms 1/4W
R118	ERDS2TJ472	Carbon	4.7K ohms 1/4W
R119	ERDS2TJ392	Carbon	3.9K ohms 1/4W
R120	ERDS2TJ125T	Carbon	1.2M ohms 1/4W
R121	ERDS2TJ222	Carbon	2.2K ohms 1/4W
R122	ERDS2TJ682	Carbon	6.8K ohms 1/4W
R123	ERDS2TJ512	Carbon	5.1K ohms 1/4W
R124	ERDS2TJ183	Carbon	18K ohms 1/4W
R125	ERDS2TJ563	Carbon	56K ohms 1/4W
R126	ERDS2TJ683	Carbon	68K ohms 1/4W
R127	ERDS2TJ183	Carbon	18K ohms 1/4W
R128	ERDAS2CF7500	Metal	750 ohms 1/4W
R129	ERDAS2CF1201	Metal	1.2K ohms 1/4W
R130	ERDAS2CF3900	Metal	390 ohms 1/4W
R131	ERDS2TJ682	Carbon	6.8K ohms 1/4W
R132	ERG1SJ562P	Metal	5.6K ohms 1/8W
R133	ERDS2TJ562	Carbon	5.6K ohms 1/4W
R134	ERDS2TJ392	Carbon	3.9K ohms 1/4W

REF.NO.	PART NO.	DESCRIPTION
R135	ERDS2TJ104	Carbon 100K ohms 1/4W
R136	ERSB39G101	Metal 100 ohms
VR1	H1022A2R2K	Variable Resistor 2.2K ohms
VR2	EVND1AA00BY4	Variable Resistor 33Kohms
VR3	EVM31GA00BQ2	Variable Resistor 470 ohms
VR4	H1052A330KB	Variable Resistor 330K ohms
VR5	H1052A220KB	Variable Resistor 220K ohms
VR6	YFH1052A33KB	Variable Resistor 33K ohms
VR7	EVND1AA00B53	Variable Resistor 5K ohms
VR8	EVND1AA00BQ2	Variable Resistor 470 ohms
VR10	EVND1AA00B53	Variable Resistor 5K ohms
VR11	EWHRPAS15B24	Variable Resistor 20K ohms
VR12-14	EWHRPAS15B13	Variable Resistor 1K ohms
C1,2	ECQU2A224KN	Plastic 0.22 µF
C3	EC0S2DG681T	Electrolytic 680 µF
C5	ECEA1HFE471	Electrolytic 470 µF 50V
C6	ECEA1VGE471	Electrolytic 470 µF 35V
C7	ECEA1EGE471	Electrolytic 470 µF 25V
C8	ECEA1EGE221	Electrolytic 220 µF 25V
C20	ECEA1CF221	Electrolytic 220 µF 16V
C21	ECQB1H103JZ	Plastic 0.01 µF 50V
C22	ECQF2274JZ	Plastic 0.27 µF 250V
C23	ECEA1EU101	Electrolytic 100 µF 25V
C24	ZCEA1HU010B	Electrolytic 1µF 50V
C25	ZCEA1CU100B	Electrolytic 10µF 16V
C26	ECEA1EU222	Electrolytic 2200 µF 25V
C27	ECCD2H100DC	Ceramic 10 pF 500V
C28	ECKD2H102KB	Ceramic 1000 pF 500V
C29	ECKD3D681KBN	Ceramic 680 pF 2KV
C30	ECWH15H562HD	Plastic 5600 pF
C31	ECEA2CG330S	Electrolytic 220 µF 160V
C32	ECEA2ES220	Electrolytic 22 µF 125V
C33	ECEA1HU100	Electrolytic 10 µF 50V
C34	ZCEA1HU010B	Electrolytic 1 µF 50V
C35	ECEA1CU470	Electrolytic 47 µF 16V
C36	ECEA1CF221	Electrolytic 220 µF 16V
C37	ECEA1HU3R3	Electrolytic 3.3 µF 50V
C38	ECCF1H470JC	Ceramic 47 pF 50V
C39	ECQP1H151JZ	Plastic 150 p 50V
C40	ECQB1H103JZ	Plastic 0.01 µF 50V
C41	ECEA1CU330	Electrolytic 33 µF 16V
C42	ZCEA1HU010B	Electrolytic 1 µF 50V
C43	ECQM1H563JZ	Plastic 0.056 µF 50V
C45-47	ECKF1H221KB	Ceramic 220 pF 50V
C48	ECCF1H270JC	Ceramic 27 pF
C49	ECQB1H103JZ	Plastic 0.01 µF 50V
C50	ECEA1HU2R2	Electrolytic 2.2µF 50V
C51	ECCF1H270JC	Ceramic 27 pF
C52	ECCF1H220JC	Ceramic 22 PF 50V
C53	ECQV1H273JZ	Plastic 0.027µF 50V

REF.NO.	PART NO.	DESCRIPTION
C54	ECSF1EE225	Electrolytic 2.2 µF 25V
C55	ECQB1H223JZ	Plastic 0.022 µF 50V
C56	ZCEA1HU010B	Electrolytic 1 µF 50V
C57	ECEA1VU4R7B	Electrolytic 4.7µF 35V
C58	ZCEA1HU010B	Electrolytic 1 µF 50V
C60	ECCR1H221J5	Ceramic 220 pF
C61	ECCR1H121J5	Ceramic 120 pF
C62	ECEA1VU4R7B	Electrolytic 4.7 µF 35V
C63	ECQP1H221JZ	Plastic 220 pF 50V
C64	ECEA1CU221	Electrolytic 220 µF 16V
C65	ECKF1H152KB	Ceramic 1500 pF 50V
C66	ECQB1H103JZ	Plastic 0.01 µF 50V
C67	ECEA1VU4R7B	Electrolytic 4.7 µF 35V
C68	ZCEA1CU100B	Electrolytic 10 µF 16V
C69	ECQP1H152JZ3	Plastic 1500 pF 50V
C70	ECCF1H221JC	Ceramic 220 pF 50V
C72	ECQB1H562JZ	Plastic 5600 pF 50V
C73	ECQP1H222JZ3	Plastic 2200 pF 50V
C74	ECQM1H333KZ	Plastic 0.033 µF 50V
C75	ECQB1H103JZ	Plastic 0.01 µF 50V
C76	ECEA1VU101	Electrolytic 100µF 35V
C77	ECQP1103GZ	Plastic 0.01 µF 100V
C78	ECKD2H122KB2	Ceramic 1200 pF 500V
C79	ECQM1H563JZ	Plastic 0.056 µF 50V
C81	ECQV1H473JZ	Plastic 0.047 µF 50V (TF)
C82	ECQM1H333KZ	Plastic 0.033 µF 50V
C83	ZCEA1HU010B	Electrolytic 1 µF 50V
C88,89	ECQB1H103JZ	Plastic 0.01 µF 50V
C90,91	ECQP1H121JZ3	Plastic 120 pF 50V
C92	ECCF1H680JC	Ceramic 68 pF 50V
C93	ECCF1H100DC	Ceramic 10 pF 50V
C94	ECEA1CU331	Electrolytic 330 µF 16V
C97	ECKF1H222KB	Ceramic 2200 PF 50V
C100	ECEA1EKN4R7	Electrolytic 4.7 µF 25V
C101	ECQB1H103JZ	Plastic 0.01 µF 50V
C102	ZCEA1HU010B	Electrolytic 1µF 50V
C103	ECEA25V3R3T	Electrolytic 3.3 µF 25V
C105	ECCF1H820JC	Ceramic 82 PF 50V
C106	ECCF1H270JC	Ceramic 27 PF 50V
L1	YFELF18D650P	Coil 65 µH
L2	ELH5L60	Coil
L4	EL05SI6R8K	Coil 6.8 µH
L5	EL05SI560K	Coil 56 µH
L6	ELT10Z383	Coil
L7	YW29188EG	Coil
L8	EL05SI101K	Coil 100 µH
L9	EFDEN645A11G	Coil
L10	EL05SI8R2K	Coil 8.2µH
T2	TLH15412	Low Freq Transformer
T3 ⚠	ETF39L46AZ	Flyback Transformer

REF. NO.	PART NO.	DESCRIPTION
X1	YWN8R4R43	Crystal Oscillator
X2	YWCSB500F2	Crystal Oscillator
F1 ⚠	XBA2C12ET0A	Current Fuse 1.25A 250V
F2,3 ⚠	XBA2C05ET0A	Current Fuse 500mA 250V
CN1	521902A	2 pin Connector
CN2	521903A	3 pin Connector
E5	YFSN005001	LED Holder
E12-17	YWSN5053	Fuse Holder
E18,19	YW32BM12R5	Terminal
M30	YWV7DA0223A2	Heat Sink
M31	YWV2CA0265A4	Mounting Plate for Power Switch

CRT SOCKET BOARD

PCB2 (NLA)	YWVKCM140E1A	Printed Circuit Board Assy
Q201-203	2SC1573A-QRS	Transistor
R201	ERG2SJ123	Metal 12K ohms 2W
R202	ERDS2TJ391	Carbon 390 ohms 1/4W
R203	ERDS2TJ122	Carbon 1.2K ohms 1/4W
R204	ERG2SJ123	Metal 12K ohms 2W
R205	ERDS2TJ391	Carbon 390 ohms 1/4W
R206	ERDS2TJ222	Carbon 2.2K ohms 1/4W
R207	ERDS2TJ101	Carbon 100 ohms 1/4W
R208	ERG2SJ123	Metal 12K ohms 2W
R209-211	ERD25FJ272	Carbon 2.7K ohms 1/4W
R212	ERDS2TJ221	Carbon 220 ohms 1/4W
R213	ERDS2TJ122	Carbon 1.2K ohms 1/4W
VR201	H1052A331B	Variable Resistor 330 ohms
VR202	H1052A3R3KB	Variable Resistor 3.3K ohms
VR203	H1052A471B	Variable Resistor 470 ohms
VR204	H1052A3R3KB	Variable Resistor 3.3Kohms
C201	ECKD3D681KBN	Ceramic 680PF 2KV
C202	ECCF1H561J	Ceramic 560 PF 50V
C203	ECCF1H471J	Ceramic 470 PF 50V
C204,205	ECCF1H102J	Ceramic 1K ohms
L201	YFEL06SI151K	Coil 150 µH
SW201	EVQR0BL12	Lever Switch
PL201	YFSA-80D	Neon Lamp
CN201	EMCS0852M	8 pin Connector

REF.NO.	PART NO.	DESCRIPTION

REAR BOARD

PCB3	YWVKDM140E1A	Printed Board
R301	ERDS2TJ750	Carbon 75 ohms 1/4W
SW301	YWSSC-322A	Slide Switch
CN301	EMCS0351ML	3 pin Connector

ACCESSORY PARTS/PACKAGING PARTS

M40	YWV8QA1675AN	Operating Instructions
M41	YWT20X35C03	Polyethylene Bag
M42	YWT80X90X1	Polyethylene Bag
M43	YWV9CA1207AN	Packaging